SPATIAL TRENDS AND FACTORS OF PIMPLE MOUND FORMATION IN EAST-CENTRAL TEXAS

A Thesis

by

CHANCE MARC ROBINSON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2012

Major Subject: Soil Science

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Approved by:

Chair of Committee,	Charles T. Hallmark
Committee Members,	Sam Feagley
	Fred E. Smeins
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ABSTRACT

Spatial Trends and Factors of Pimple Mound Formation in East-Central Texas.

(May 2012)

Chance Marc Robinson, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Charles T. Hallmark

Pimple mounds are circular to elliptical domes with basal diameters ranging from 3 to more than 30 m, and heights of 30 cm to more than 2 m above intermound levels. For almost two centuries, the origin of these features has been speculated upon by scientists without general consensus as to one of over 30 different mechanisms suggested for their origin. These soil microfeatures can be observed throughout portions of East Texas as well as Louisiana, Arkansas, Oklahoma, and Missouri. Pimple mounds have been extensively mapped throughout East Texas as complexes covering over 1.0 million ha in 47 soil survey areas. About 600,000 ha are on Pleistocene-age geological formations.

This study focused on 5,500 ha in Leon County, Texas, mapped as Rader-Derly complex and Derly-Rader complex. Rader (Aquic Paleustalfs) is on mounds and Derly (Typic Glossaqualfs) in the low intermounds. These soils are mapped primarily on terraces of the Trinity River system within the survey area. Using elevation levels published for the various fluviatile terrace deposits of the Trinity River, six groups (five terrace level groups and an upland group) were identified for analysis of mounds within the study area. Processes and factors of soil formation during the life of these features were considered using two methods – remotely sensed elevation data and sampling data collected in the field. Size, shape, and relief of mounds were analyzed using airborne-based, remotely sensed LiDAR (Light Detection and Ranging) elevation data. Particle size distributions and pedon descriptions of mounds formed on materials of various ages were compared across the study area with special emphasis given to spatial trends.

Analyses indicate a fluvial origin with pimple mound orientation corresponding to surrounding ridge and swale features of the paleoriver. Pimple mounds within the study area formed in the presence of sandy to loamy alluvial sediments and require the presence of accretionary ridge microtopography over point bar deposits. This alluvial parent material and topography were further developed by fluctuations in climate and vegetation over time. The erosional influence of bioturbation by animals and the intense rainfall and flood events which frequent the study area provided an environment in which these soil microfeatures have developed and over time exhibit increased levels of pedogenesis.

To Suzanne, Lyndsay, and Clara

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Thanks to all of my family, and especially to my parents for their encouragement. Finally, I am blessed and grateful to my wife for her patience, love, and support throughout this time. To Lyndsay and Clara, I trust that in the future you will understand why I spent so many hours away from home, but for now know that Daddy will be home to play with my girls and to tuck you in at night. I love you.

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INTRODUCTION

“Pimple mounds are circular to elliptical domes with a texture often consisting of sandy loam that is coarser than the surrounding soil, basal diameters ranging from 3 m to more than 30 m, and heights of 30 cm to more than 2 m above intermound levels” (Bates and Jackson, 1984). These soil microfeatures can be observed on landscapes throughout portions of eastern Texas as well as parts of Louisiana, Arkansas, Oklahoma, and Missouri (Fenneman, 1938; Knechtel, 1952). Pimple mounds have been extensively mapped by United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) Soil Survey personnel throughout eastern Texas mostly as complexes covering over 1.0 million ha in 47 soil survey areas (Fig. 1). In Texas about 600,000 ha of these map units (Robinson, 2011) are on Pleistocene-age geological formations (Barnes, 1992). With the completion of soil mapping in Texas, an opportunity arises to recognize the distribution of pimple mounds in Texas, identify the geological units that most often exhibit pimple mounds, delineate features common to mounds, and recognize spatial trends in the morphology of mounds across their range.

For almost two centuries, the origin of these landscape features has been speculated by scientists without general consensus as to one of over 30 different mechanisms suggested for their origin (Aten and Bollich, 1981). The most common and widely accepted theories of origin in the south-central United States include biotic

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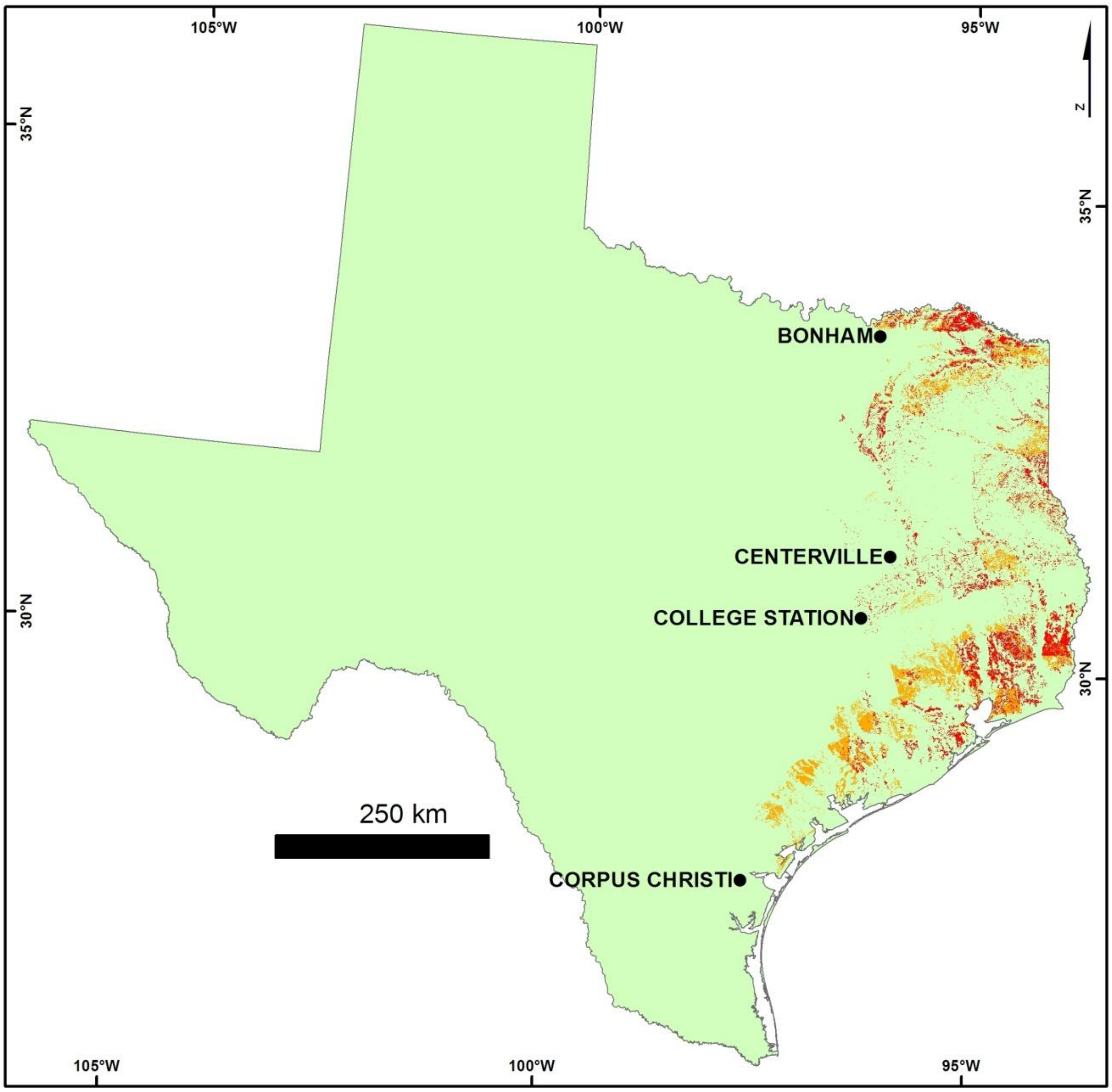


Fig. 1. Texas pimple mound map unit extent. Pimple mound-intermound soil map unit complexes (red) and soil map unit consociations with minor inclusions of pimple mound soils (orange). The study area consisted of pimple mound-intermound soil map unit complexes in Leon County, Texas, county seat of which is Centerville. Other Texas cities near the boundary of pimple mound extent in Texas include Bonham, Corpus Christi, and College Station.

influences usually attributed to pocket gophers (Cox, 1984; Horwath and Johnson, 2006; Koons, 1948), eolian deposition (Aronow, 2000; Carty et al., 1988; Cox, 2008; Seifert et al., 2009), erosion (Cain, 1974; Melton, 1929), remnants of meander ridges or a combination of fluvial, erosional, and eolian processes (Holland, 1952; Krinitzsky, 1949), and seismic activity (Berg, 1990). Most studies have focused on selected sites chosen from ground observations. Using remote sensing techniques now available affords an opportunity to better understand spatial relationships and trends which previously have been obscured due to an inability to examine pimple mounds by methods other than close observation.

Light Detection and Ranging (LiDAR) is a remote sensing technique that utilizes a high-frequency pulsed laser beam from an airborne platform that scans the land surface and allows for exclusion of vegetation from the remotely sensed data (Wehr and Lohr, 1999). This enables the creation of high-resolution Digital Elevation Models (DEM) (Bielecki and Mueller, 2002). The ability to exclude vegetation such as forest canopy cover for analysis of the ground surface below makes this method quite useful in the study of pimple mounds across their range which includes many forested areas. Such a method has been utilized in the Central Valley of California to study similar mounds (Reed, 2008), but as yet the pimple mounds of the south-central United States have not been studied using these methods.

In pimple mound-intermound soil map unit complexes, two or more components differ drastically in response to micro-scale landscape changes. These differences can potentially alter use and management between the opposing pimple mound and intermound areas. By definition a soil complex consists of two or more dissimilar components in morphology or behavior that occur in a regular repeating pattern and cannot be mapped separately at the scale of mapping (Soil Survey Staff, 1993). USDA-NRCS currently offers the public an ability to view detailed soil maps and soil interpretations for land use and management decisions through the use of Web Soil Survey (Soil Survey Staff. USDA. NRCS., 2011). These interpretations are offered based on the dominant soil map unit component. Through the use of LiDAR data in pimple mound-intermound complexes, a method for detection of micro-scale landscape changes based on soil taxonomy could be incorporated into the current framework of Web Soil Survey and offered to the public. This method, if perfected, could prove useful in providing more detailed interpretations of soil complexes in other areas where micro-scale landscape changes are indicative of interpretative taxonomic changes.

OBJECTIVES AND HYPOTHESES

The objectives of this study are: (i) to assess current hypotheses of pimple mound genesis within the study area and across the range of pimple mounds in Texas; (ii) to identify a suitable method for making soil survey interpretations based on micro-scale landscape changes; and (iii) to provide a better understanding of the spatial trends and factors of pimple mound formation as affected by the five soil forming factors (Jenny, 1941) and exhibited by pimple mound morphology and characteristics.

Based on the first research objective, the following generalized hypotheses were selected for testing with respect to mound genesis in the study area:

1. Eolian deposition associated with local reworking of sediments coupled with drier climates (Aronow, 2000; Carty et al., 1988) and intense climate change of the recent past (Holocene-Age) (Cox, 2008; Seifert et al., 2009);
2. The work of burrowing animals, namely the plains pocket gopher (*Geomys bursarius* Shaw), by accretionary deposition of soil (Horwath and Johnson, 2006; Koons, 1948);
3. Erosional segmentation of accretion ridges on point bar deposits (Krinitzsky, 1949);
4. Erosional and depositional action by wind or water coupled with retention of residual soil hillocks or mounds by vegetation (Cain, 1974; Melton, 1935).

REVIEW OF LITERATURE

Previous Hypotheses of Origin

Theories of pimple mound origin have ranged from plausible to pure speculation and have been in existence prior to the first Europeans viewing these features in the south-central United States. The first observations of pimple mounds recorded are found in a Spanish colonial report dated October 1767 when Nicolás de la Fora described the use of flat-topped mounds in crossing an area of poor drainage between the Trinity and Neches Rivers in East Texas (Aten and Bollich, 1981; LaFora and Kinnaird, 1958). Local folklore attributes a legend to the Caddo Indians of southwestern Louisiana to explain the genesis of pimple mounds. The legend states that a race of giants once inhabited the area. The giants being called from their labors emptied their aprons of soil leaving the residual piles of soil which now exist as pimple mounds (Harris et al., 1899; Krinitzsky, 1949).

William Darby was the first to record a hypothesis for pimple mound origin in which he ascribes their formation to "a kind of mole" in Prairie Mamou of central Louisiana (Darby et al., 1817). In time over 30 different mechanisms have been suggested for the origin of these ubiquitous soil microfeatures of the south-central United States (Aten and Bollich, 1981; Cain, 1974; Washburn, 1988).

Some hypotheses first proposed over 100 years ago have been disproven or abandoned while others are considered partially relevant today in some circles.
Le Conte (1877) attributed the mounds to surface erosion under peculiar conditions –

these conditions being a bare country and a drift soil of finer and more movable above and coarser and less movable below. Hilgard (1905) attributed mound formation to some kind of ant, as did Veatch (1905), but he mentions three hypotheses: a spring and gas vent hypothesis, eolian sand dunes, or ant hill origin, after which he indicates his preference of the dune or ant hill hypotheses. One writer speculated that some large scale concretionary action might have caused the accumulation of mineral matter in mounds due in part to chemical and physical conditions in existence during the time of formation (Branner, 1905).

While many hypotheses were proposed in the late nineteenth and early twentieth century, it would be many years before further study would occur outside of the intense debate which occurred between writers of the period. Melton (1929) complained that many writers have persisted in advancing a single hypothesis for mound origin, and in his referring to the 1905-1907 period, called the debate very nearly, if not actually, a laughing matter. Shortly after writing this statement, Frank Melton would find himself in the midst of an intense debate with writer, John Rich regarding Melton's erosional theory in which he preferred the term "residual soil hillocks" to support his ideas of stream action and gullying while Rich speculated that some differential weathering may have occurred associated with rainfall and tree cover (Melton, 1935; Rich, 1934).

Published hypotheses of a biotic influence focused on ant mounds until a writer proposed a theory attributing pimple mound origin along the Texas Coast Prairie to that of the pocket gopher (Koons, 1926), perhaps the "kind of mole" introduced previously (Darby et al., 1817). In Koons' writing, the only recorded observations of active mound construction are found and attributed to the pocket gopher. His observations were made near his home in Wharton County, Texas over a period of five years in the early 1920s (Koons, 1926).

For many years the work of the pocket gopher has retained an important position among the numerous hypotheses of mound formation, but most research has focused on locales far removed from the south-central states of Texas, Louisiana, Arkansas, Oklahoma, and Missouri. Writers supporting the pocket gopher hypothesis of origin have focused their writing largely on areas of the northwestern states specifically the Puget Sound area of Washington (Dalquest, 1942; Scheffer, 1947), but also California (Arkley and Brown, 1954; Cox, 1984; Cox, 1986), Minnesota (Ross et al., 1968), Missouri (Horwath and Johnson, 2006), as well as international locations such as Kenya (Cox and Gakahu, 1983; Cox and Gakahu, 1984), and Argentina (Cox and Roig, 1986).

The theory of Scheffer (1947) has been extensively cited by writers favoring a pocket gopher theory of origin. He outlines seven facts as evidence of his theory: 1. the sharing of pocket gophers and “mima mounds” of a similar range along the Pacific Coast, 2. the lack of other burrowing animals in some areas rich in “mima mounds” as evidence of pocket gopher exclusivity in origin, 3. the presence of an underlying dense horizon of hardpan, bedrock, or gravels, 4. a lack of deep sand deposits in mounded areas, 5. a complete lack of orientation or any discernible pattern of “mima mounds”, 6. extensive current vegetative cover and downward flow path of water as evidence of a lack of erosion in the past, and 7. the presence of unstratified soil in mounds contrasting to the surrounding horizonated substratum: for example, "gopher-size" rocks in the mound and large heavy cobbles beneath and beside the mounds, a dip in the substrate beneath the mound (concave lens pattern), and a sunken depression usually found on the summit of mounds.

Other hypotheses for mound genesis included suggestions of freezing and thawing action in various northern states (Malde, 1964; Spackman and Munn, 1984; Washburn, 1956; White and Agnew, 1968), a ground water vortex hypothesis in Wyoming (Reider et al., 1996), and a seismic hypothesis from Missouri (Berg, 1990).

Krinitzsky (1949) contended that the features formed in coastal areas differ from those formed in fluvial meander belt deposits, and likewise differ from those formed in glacial deposits and frigid areas. He recorded observations of pimple mounds formed in arcuate rows that follow ridge and swale patterns within fluvial meander scrolls suggesting erosional segmentation of accretion ridges on point bar deposits.

Other writers have recorded similar patterns in their observations, but with different conclusions. In northeast Texas and southeastern Oklahoma, similar patterns of orientation were attributed to stream erosion or gullying (Melton, 1929; 1935) rather than any association with ridge and swale patterns of meandering rivers or streams. In Beauregard Parish, Louisiana, pimple mound orientation patterns were also attributed to stream erosion, but in greater detail the writer concludes that small pimple mounds present at the headwaters of small, intermittent streams were not present further downstream, instead elongated ridge patterns were present (Holland, 1952). These small pimple mounds near the headwaters may have formed on an older surface than the elongated ridges, but this cannot be definitively confirmed.

Most recent conclusions of origin in the south-central United States have centered upon the following: eolian deposition associated with local reworking of sediments coupled with drier climates (Aronow, 2000; Carty et al., 1988), eolian deposition associated with intense climate change of the recent past (Holocene-Age) (Cox, 2008; Seifert et al., 2009), and wind and water erosional theories (Cain, 1974; Collins, 1975). Each of these hypotheses have been embraced with varying emphasis placed on the impacts of past climate change and vegetation. Other studies focused on solving issues related to soil taxonomy of mounds (Allgood and Gray, 1973; Sobecki and Wilding, 1982; Sobecki and Wilding, 1983) as well as issues of use and management associated with pimple mounds (Lorio, 1968; Lorio and Hodges, 1971), but have in large part avoided the intense debate surrounding mound genesis.

Factors of Pimple Mound Formation

Soils can be defined as "dynamic natural bodies having properties derived from the combined effects of climate and biotic activities, as modified by topography, acting on parent materials over periods of time," and yet these five soil forming factors (climate, biota, topography, parent material, and time) are never independent of one another, but always interdependent with each factor exerting its affect on soil properties (Brady and Weil, 2008; Jenny, 1941). These five factors should be considered with respect to pimple mound formation and genesis.

Currently the range of pimple mounds in the Gulf Coastal Plain closely follows the 1,000 mm (40 inch) rainfall line to the west and the Mississippi River to the east

(Cain, 1974). Figure 1 details the extent of pimple mound soils in Texas. Pimple mound soils are predominantly of the thermic soil temperature regime with some inclusions of hyperthermic soil temperatures. Pimple mound soils are predominantly of the udic soil moisture regime, but often mounds are found in the aquic soil moisture regimes as well as some instances of the ustic soil moisture regime. While today these soils continue to develop in what are somewhat warm thermic soil temperatures and moist udic soil moisture conditions, the pimple mounds of today may have formed in a drastically different climate. Therefore, recent research has in large part focused on attempting to answer this question.

Climate has been deemed a potential major factor in pimple mound formation for a number of years with one early writer stating that if either the once popular ant hill theory or the sand dune (eolian) theory were correct, the mounds are indicative of recent important climate change (Veatch, 1905). Tree-ring reconstructions record megadroughts and a history of intense climate change in the past 1,000 years (Stahle et al., 2007), as well as much drier climates and more pronounced periods of aridity when compared to modern drought (Cook et al., 2007; Stahle et al., 2007). Luminescence dating has also been utilized for study of drought records; these studies have shown even greater intensity in the past with several episodes of aridity between 63,000 and 5,500 years before the present (Otvos, 2004).

While a normal percolative moisture regime and downward movement of water might be expected in a humid climate, areas of low bottomland or similar landscape positions often exhibit a moisture regime which varies seasonally, amphipercolative

(Yaalon, 1983). This allows for periods in which precipitation exceeds evaporation and leads to ponding of water in lower topographic positions, and a general downward movement of water. This is followed by periods in which evaporation exceeds precipitation and upward movement of water occurs at the capillary fringe. This upward movement of water is signaled by the precipitation of calcite (Allen and Fanning, 1983) and soluble salts such as gypsum at the capillary fringe.

Secondary carbonate and calcic horizon formation have been recorded in pimple mounds as a product of calcite-saturated groundwater (Carty et al., 1988; Sobecki and Wilding, 1983). However the downward leaching environment with limited upward water movement in pimple mounds as proposed by Carty et. al. (1988) may be the dominant water relationship in most pimple mound soils with upward movement of water only common deeper in the soil or vadose zone.

Additionally climate is a major contributor to several pedogenic processes common in pimple mound soils, namely the formation of glossic horizons and plinthite. Soil taxonomy defines a glossic horizon as having developed from the degradation of an argillic, kandic, or natric horizon from which clay and free iron oxides have been removed. Further it must have an eluvial part constituting of 15 to 85 percent and an illuvial part containing remnants of the degraded argillic, kandic, or natric horizon (Soil Survey Staff, 2010). Miller (1983) discusses the relationship of glossic horizons to weathering environment and notes more extensive development of glossic features and more acid soil conditions in poorly drained Ultisols. Further, discussion is made of interrelationships between the formation and development of glossic horizons with the process of ferrolysis. Ferrolysis involves the weathering of aluminosilicate clays and the development of soil acidity through alternating oxidation and reduction periods in which ferrous Fe displaces exchangeable cations during reducing periods and reforms ferric compounds during reoxidation (Brinkman, 1982). Seasonal water fluctuations were shown to be common in pimple mound soils of the Coast Prairie (Griffin, 1991; Starowitz, 1994) and these fluctuations likely occur in other areas because of the nearly level slope of pimple mound landscapes coupled with the microtopography of mound surfaces.

Plinthite is defined as an iron-rich, humus poor mixture of clay with quartz and other minerals commonly appearing as dark red redoximorphic concentrations. Exposure to repeated wetting and drying irreversibly changes plinthite to an ironstone hardpan or to irregular aggregates (Soil Survey Staff, 2010). Plinthite formation requires sufficient time, adequate supplies of Fe together with alternating oxidizing and reducing conditions associated with fluctuating water tables (Miller, 1983).

Biota is often indicative of other factors of soil formation, but in some situations, biota exerts an important influence on future soil characteristics. Vegetation plays an important role in some theories of pimple mound formation including: shrubs or trees serving to trap sediments in an eolian depositional or coppice dune theory (Cox, 2008; Seifert et al., 2009), pedestal trees associated with rill erosion (Cain, 1974), and vegetation serving to prevent further erosion of fluvial deposited mounds and ridges (Krinitzsky, 1949). As previously discussed, faunal biota, namely the pocket gopher, also play an important role in other theories of pimple mound formation (Arkley and

Brown, 1954; Cox, 1984; Dalquest, 1942; Horwath and Johnson, 2006; Koons, 1948; Scheffer, 1947).

Topographically, pimple mounds strikingly contrast with the surrounding relief. They are found predominantly on nearly level to gently sloping surfaces (0-3% slope). Some authors have attempted to place a limit to the slope on which pimple mounds can be found with estimates ranging from a maximum of about a 10% slope in some abnormal cases (Cain, 1974) to as great as 20% slope (Seifert et al., 2009).

Geologically, pimple mounds in Texas exist most predominantly on Pleistocene-age deposits with at least 60% of pimple mound soil map units existing on such deposits which are often found on stream terrace deposits (Robinson, 2011). Some have recorded observations of pimple mounds on much older surfaces including those of Tertiary age (Seifert et al., 2009), Mississippian age (Cain, 1974), and Pennsylvanian age (Allgood and Gray, 1973) deposits. Pimple mounds are largely, if not entirely, absent from the most recent Holocene-age deposits (Cain, 1974).

Consideration of wind as the primary vector for pimple mound formation requires an understanding of the characteristics of eolian or dune deposits in relation to fluvial deposits. Selley (2000) states that, in general, while fluvial sands are moderately sorted and rounded, eolian sands tend to be extremely well sorted and well rounded. Visher (1969) suggested that each log-normal subpopulation within a sediment sample could be related to three different modes of sediment transport and deposition (saltation, suspension, and surface creep). He found that 97-99 percent of dune (eolian) sediments were transported by saltation and exhibited excellent (well or extremely well) sorting and 65-98 percent of fluvial sediments were transported by saltation and exhibited fair (moderate) sorting while 2-35 percent of fluvial sediments were transported in suspension.

Ahlbrandt (1979) divided eolian sands into three categories: coastal, inland, and interdune environments and found that moderate to well-sorted fine to medium sands dominated inland eolian dunes. He analyzed 191 inland eolian sand samples and found that these sediments ranged from 114 to 1048 µm in size with a mean of 281 µm (medium sands). These sediments standard deviation values ranged from 0.11 σ_I (very well sorted sediments) to 1.68 σ_I (poorly sorted sediments) with a mean of 0.73 σ_I (moderately well sorted sediments). While the degree of sorting of eolian deposits trends toward moderate to well sorting, poorly-sorted fluvial deposits are the sources for many dunes (Daniels and Hammer, 1992). This implies that if pimple mounds originated as eolian dunes or ridges of locally reworked fluvial sediments, the degree of sorting would be expected to be different in the eolian sands (increase in sorting) despite the sediments origin from the nearby fluvial sediments.

The time with which these soils have formed is important in answering questions of their origin, but these efforts can be difficult. Luminescence dating has been used in an attempt to determine the age of pimple mounds. These dates are much younger than other estimates with dates ranging from as recent as 150-200 years before present (ybp) to as great 6,000 to 7,200 ybp. (Otvos, 2004; Seifert et al., 2009). Archaeological dating has estimated pimple mound deposition of selected mounds along the Texas Coast Prairie to have been deposited 700 to 2000 ybp (Aten and Bollich, 1981; Seifert et al., 2009). In Missouri, archaeological dating estimated pimple mound deposition to have been began prior to 5,000 ybp (O'Brien et al., 1989; Seifert et al., 2009).

In this research, the interdependence of the five factors of soil formation as they have affected the development of pimple mounds in a specific region of Texas will be considered. Further, pimple mound formation and subsequent development may be influenced more strongly by certain factors in one locale, but not so in another region of different conditions. We were especially wary of taking the path of so many others in advancing a single hypothesis of mound genesis for all locales (Melton, 1929). Through the use of the method of multiple working hypotheses as outlined by Chamberlin (1897) this path can be averted.

MATERIALS AND METHODS

Site Description

Leon County in east-central Texas was selected as the study area. The county seat of Leon County, Centerville is shown in relation to pimple mound distribution in Fig. 1 and 2. The study area is in the Texas Claypan Area of the West Gulf Coastal Plain (USDA-NRCS, 2006). Mean annual temperature for Centerville is 18.6° C, and mean annual precipitation is 1094 mm (NOAA, 2011). Soils are in the thermic soil temperature regime and the aquic, udic, or ustic soil moisture regimes (Neitsch et al., 1989). Current vegetation consists predominantly of improved pasture and regrowth of mixed hardwood forest. Longtime Leon County resident, John T. Gresham (born in 1919) describes the study area ~1930, as containing many areas of closed canopy old growth hardwood forest where pimple mounds are found today. Gresham states that these hardwood forests contained limited undergrowth possibly due to shade, but also concedes that annual winter burning by landowners was common at the time. He also contends that one could “ride a horse full gallop” through many of these forested areas in which dominant vegetation consisted of white oak (*Quercus alba* L.), pin oak (*Quercus phellos* L.), and overcup oak (*Quercus macrocarpa* Michx.) (personal communication, June 7, 2011).

The study area consisted of about 5,500 ha mapped as Rader-Derly complex and Derly-Rader complex. Within these complexes the Rader series (Aquic Paleustalfs) comprises the mounds and the Derly series (Typic Glossaqualfs) occupies the low

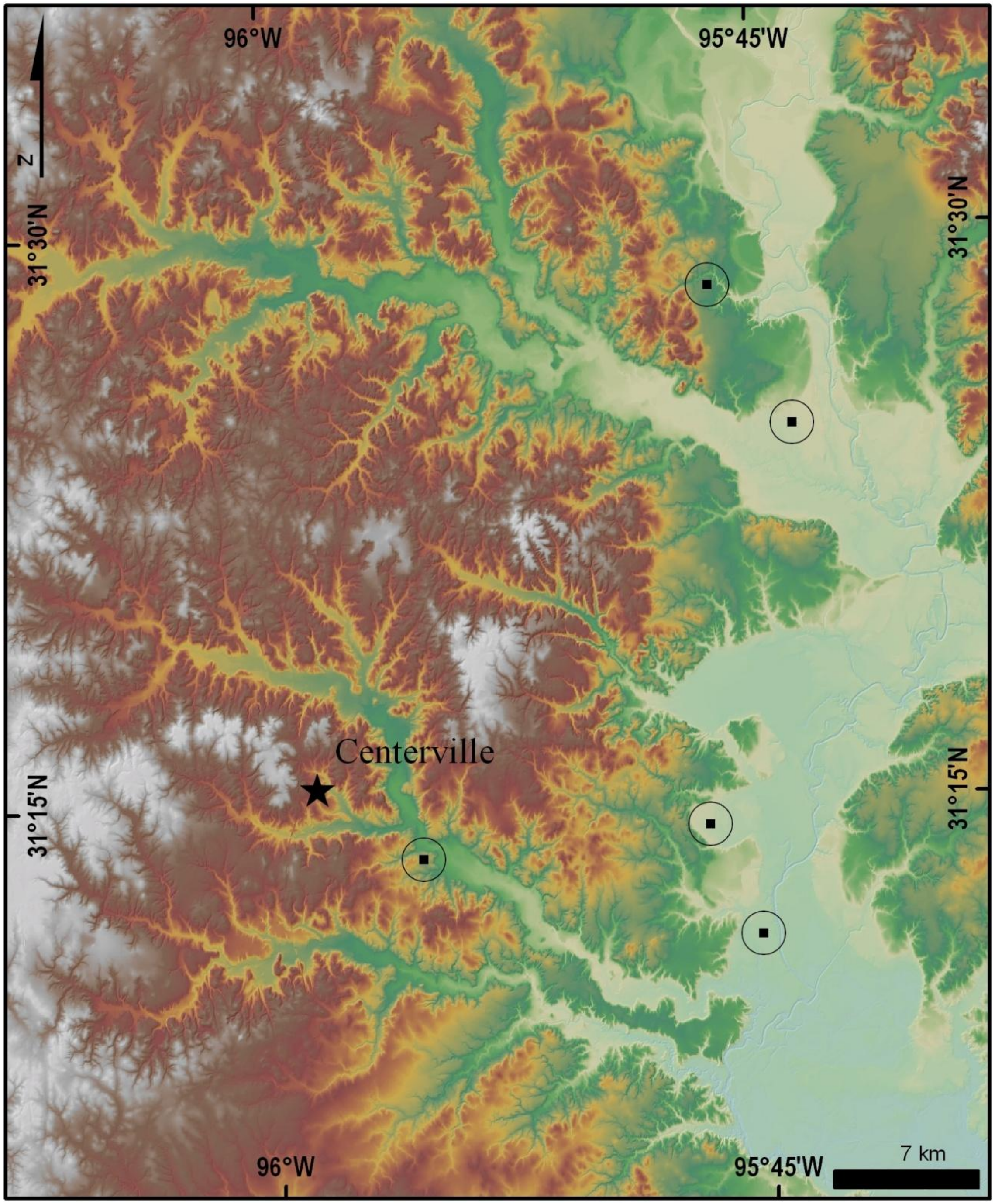


Fig. 2. Shaded relief image of study area. Sampling locations (points within a circle) and Leon County seat of Centerville, Texas (star) are indicated in relation to the landscape of the Trinity River Valley and surrounding uplands.

intermounds (Neitsch et al., 1989). These soils are mapped primarily on fluviatile terraces of the Trinity River system within the survey area. Using elevation levels of the Trinity River terraces (Nordt, 1986), six groups were identified for analysis of mounds within the study area (Fig. 3). These groups include five terrace level groups (T-1, T-2, T-3, T-4, T-5) and an upland group. This approach provided a stratified method for sampling and analysis of pimple mounds across the range of the study area.

Five locations were analyzed including two T-1 sites, one T-2 site, one T-4 site, and one T-5 site (Fig. 2). In each site a pimple mound was selected for analysis using a traverse method with cores taken across the mound and into the adjacent intermound area on each side. The traverse direction was chosen using LiDAR images and field observations to follow perpendicular to what appeared to be the ancient river channel. Where possible, a nearby meander ridge was also sampled with similar spacing of traverse cores. At one representative site, a pimple mound and adjacent intermound was sampled from a continuous trench and visually observed for diagnostic features and trends not readily visible from cores.

All sites were assumed to have been disturbed by plowing or removal of timber, but care was taken to choose pimple mounds and meander ridges which exhibited limited human disturbance. A minimum of five soil cores obtained with a truck-mounted Giddings probe (diameters of 3 and 7.6 cm) for each microfeature (pimple mound or meander ridge) was taken to a depth that included the underlying bed load of the ancient river system and sampled for composite bulk sample. At the continuous trench site, clods were collected in triplicate for bulk density. The cores were described

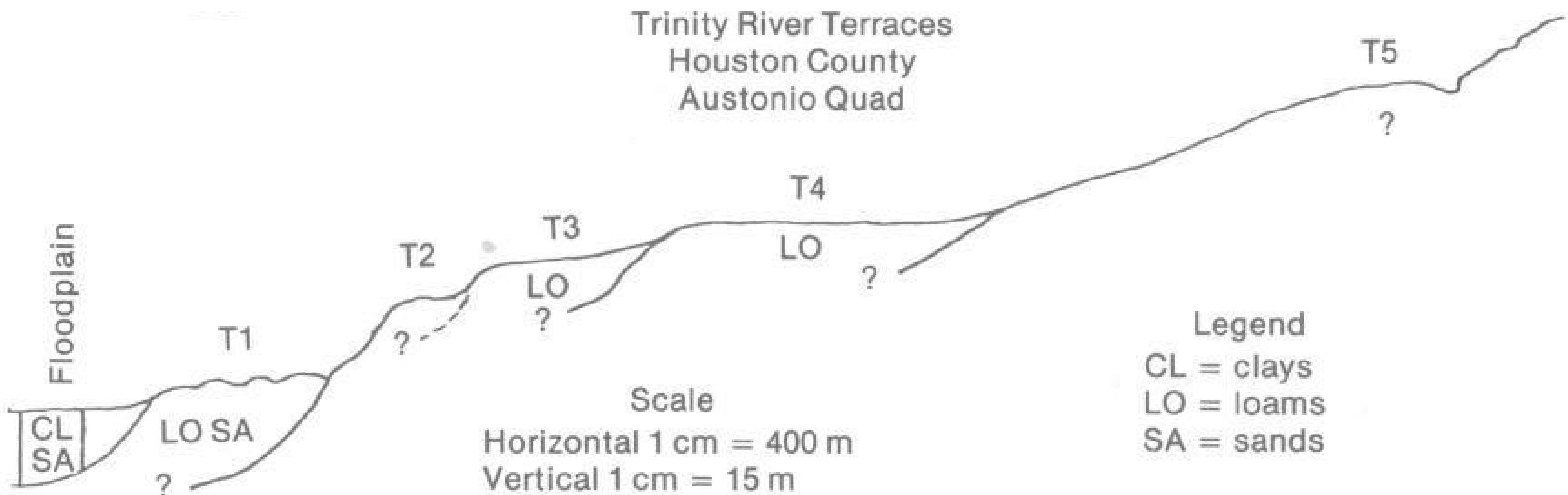


Fig. 3. Trinity River terraces in Houston County, Texas (Nordt, 1986). The Austonio Quad in Houston County is east of and near the central portion of study area in Leon County, Texas. Figure reprinted with permission.

by horizon (Schoeneberger et al., 2002), and horizons were divided according to the smallest observable diagnostic change with the intention of sampling not greater than 10-20 cm depth per horizon, however horizons of greater thickness were sampled if observable diagnostic changes were not evident. At each sampling location precise geographic coordinates and elevation measurements were collected using survey quality GPS (Trimble® R7/R8 Surveying System).

Excluded from the five sampling locations were the T-3 level and upland group. The T-3 level was excluded because this level is of less extent and mounds are less pronounced. The upland group is only at a slightly higher level than the T-5 level, and these map units do not always exhibit the characteristics of pimple mounds; therefore the T-5 level was sampled in lieu of the upland level and considered representative of these older less pronounced terrace levels. The T-1 level was sampled at two locations because this level has the greatest extent of pimple mound complexes in the study area, and being the youngest geologically, could provide more data regarding mound origin.

Soil Analyses

Bulk samples were analyzed for selected physical and chemical properties to ensure proper soil taxonomic classification and to analyze trends which might point to processes of mound origin. Samples from cores at all sites were analyzed to determine particle size distribution and pH. At the selected representative site where a trench was opened by backhoe, three soils were described and sampled in bulk, and analyzed to determine electrical conductivity (EC), total carbon, calcium carbonate equivalence

(CCE), extractable bases, and cation exchange capacity (CEC). In addition to composite bulk samples, three clods were collected for each horizon and coated with Saran® dissolved in acetone for bulk density determination (Soil Survey Laboratory Staff, 1996). Analyses were conducted at the Texas AgriLife Research Soil Characterization Laboratory in College Station, Texas.

Particle size distributions were determined by the pipette (3A1) method (Kilmer and Alexander, 1949; Soil Survey Laboratory Staff, 1996; Steele and Bradfield, 1934). If present, gypsum was removed by dialysis prior to particle size analysis and particle size distributions were adjusted to account for the loss of gypsum. Gypsum content was determined by filtering a 1:10 soil:water mixture, precipitating the gypsum with acetone, measuring the EC of the dissolved precipitate and relating the EC reading to $CaSO_4$ concentration using a standard curve (6F1a) (Soil Survey Laboratory Staff, 1996).

The pH was measured on a 1:1 soil-water slurry using a glass electrode (8C1A) (Soil Survey Laboratory Staff, 1996). The EC was measured on a 1:1 soil-water slurry and, if the reading exceeded 0.4 dS/m, the EC was determined by the saturated paste extract (8A3) method of Richards (1954) (Soil Survey Laboratory Staff, 1996). Total C was determined by the CO_2 evolution dry combustion (6A2a) method in a combustion furnace (Nelson and Sommers, 1982; Soil Survey Laboratory Staff, 1996).

Calcium carbonate equivalence (CCE) was determined by CO_2 evolution using a Chittick gasometric apparatus (Dreimanis, 1962). Extractable bases (Ca, Mg, Na, and K) were obtained in 1 N NH_4OAc, pH 7.0 using an automatic extractor (5B5.) The elements Ca and Mg were measured by atomic absorption, while Na and K were measured by atomic emission (Holmgren et al., 1997; Soil Survey Laboratory Staff, 1996). Determination of CEC was measured in 1 N NaOAc, pH 8.2 by displacement after washing and analysis by measuring the flame emission of Na displaced from cation exchange sites (Holmgren et al., 1997; Richards, 1954; Soil Survey Laboratory Staff, 1996). Bulk density was determined using the Saran®-coated clod (4A) method to calculate bulk density at -1/3-bar ($Db_{1/3}$) and oven dry (Db_d). Coefficients of linear extensibility (COLE) were also calculated from the oven dry to 1/3-bar tension (4D1) method (Soil Survey Laboratory Staff, 1996).

Data Analyses

Geometric mean particle size, standard deviation (degree of sorting), median particle size, skewness, and kurtosis were calculated on a clay-free basis (0.002 to 2000 µm fraction) from particle size distributions plotted using a curve fit cumulative percent coarser curve (Folk and Ward, 1957). Clay-free geometric mean particle size were analyzed by pedon for a fining upward trend indicative of a fluvial origin (Daniels and Hammer, 1992; Davidson-Arnott and Nickling, 1978; Galloway and Hobday, 1983), and analyzed for an increase in moderate to well-sorted (standard deviations of 0.4 to 1.0) fine and medium sands indicative of inland eolian deposition (Daniels and Hammer, 1992). Analyses of potential fining upward trends prove futile if the grain sizes are limited because little vertical variation is detectable (Galloway and Hobday, 1983).

To differentiate sediments of lateral accretion from those of vertical accretion, sand and silt-size sediments were analyzed by horizon with respect to changes in total sand content, changes in clay-free mean particle size, and variations in standard deviation or degree of sorting. The standard deviation of sediments was given the greatest weight in determining depositional environment. A standard deviation of greater than 1.0 indicates that sediments were unlikely to have been deposited by wind as an eolian deposit or by water as lateral accretion of a meandering river.

Soil chemical properties were analyzed for vertical trends within microfeatures with respect to soil-water relationships. Inferences were made with respect to particle size trends and possible depositional history within microfeatures to be comparatively analyzed by terrace level in pimple mound and intermound (or paleochannel) pedons. Soil pH was utilized as an indicator of other chemical properties of pedons in which further chemical analyses were not obtained. Soil Taxonomy will be utilized to relate genetic concepts to soils within the chronosequence of sampled soils. While soil use and soil survey have influenced the development and application of Soil Taxonomy, genetic concepts of soils play an important role throughout the system (Arnold, 1983).

Spatial Analyses

Using airborne-based LiDAR data, the study area was studied for spatial trends within the established terrace level groups. For each of the six groups (T-1, T-2, T-3, T-4, T-5, and upland), 300 randomly created grids (30 m by 30 m) were selected using ArcGIS® software. These random grids were utilized for tabulating pimple mound dimensions including height (z-value) above intermound levels, north-south diameter, east-west diameter, and surface area. Tabulated height values were ranked and analyzed statistically using the Kruskal-Wallis test with tied ranks for nonparametric analysis of variance because of the large sample size (Zar, 2010). These values were also analyzed using the Tukey-Kramer Test with unequal sample sizes to consider multiple comparisons between terrace levels (Zar, 2010).

Pimple mound extent and map unit composition were analyzed based on observations at each of the four corners of the randomly created grids (Fig. 4). Tabulated values included the following categories: pimple mound, meander ridge, intermound, disturbed, other, water, out-of-map unit, and shared grid corner. For the purposes of initial analyses of remotely sensed data, the following definitions were developed and refined through observation. Mound observations were required to meet the definition of pimple mounds as published by Bates and Jackson (1984), i.e., mounds were circular to elliptical and greater than 30 cm vertically. Mound observations excluded due to height are listed in the comments column of the database. Ridges were elongated and curvilinear in dimension compared to mounds. Operationally, to differentiate mounds from ridges, a ridge was greater than two times the width of the microfeature. Most ridges were over three times longer than wide which made differentiating ridges from pimple mounds easy. Intermound observations were those on the tread of the terrace in areas not classified as mounds or ridges. These areas included depressions as well as transitional areas, but not areas within impoundments or other disturbances.

Observations excluded from further analysis included disturbed, other, out-of-map unit, shared corner, and water. The disturbed observations included private and

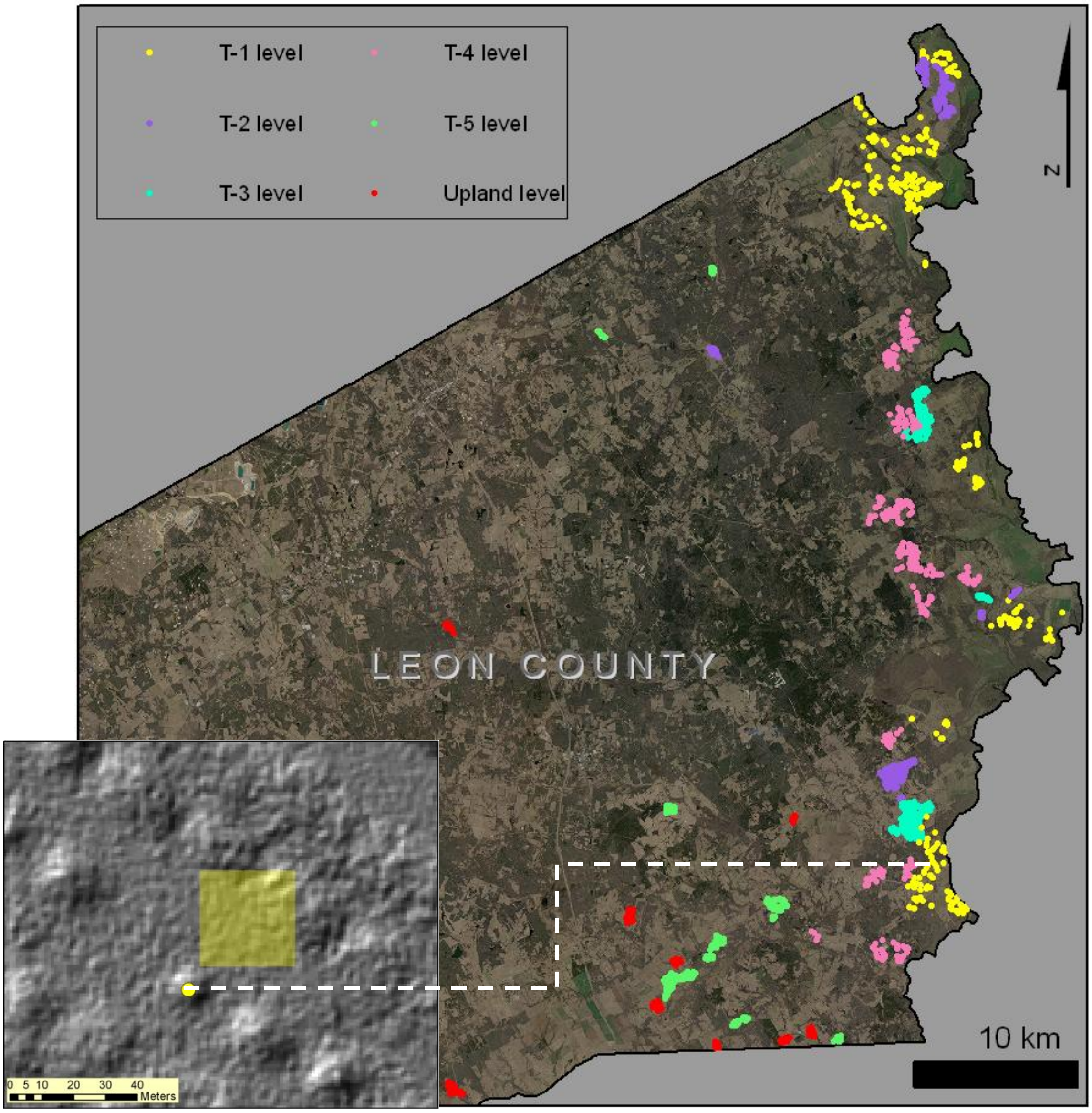


Fig. 4. Map of stratified observation points within study area. Inset of shaded relief image illustrates one of 1800 randomized 30 m grids (yellow) and observation points (yellow circle), while the endpoint of the white dashed line indicates the location of the inset observation point.

public roads, human-altered drainage ditches, structures, and impoundment dams. Observations classified as other included riser landforms, gullies, upland features, and other erosion features. Observations classified as out-of-map unit were those random grid corners which were outside of pimple mound complex map unit delineations. Observations classified as shared corner were observations in which the random grid corners were connected at one or more point. When two random observation points coincided only one observation was recorded, and the other observation was listed as a shared grid corner. Observations recorded as water were those within current water holding impoundments, creeks, or rivers.

Pimple mound extent and map unit composition were analyzed based on observations at each of the four corners of the randomly created grids. After values were tabulated, a total of ~7200 points as illustrated in Fig. 4 (300 selected grids within six groups with four observation points per grid) within the two selected map units were analyzed for percentage of map unit composition according to microfeature.

Outliers as discussed previously were excluded from proportions of mound, ridge, and intermounds. Data were normalized using a slight modification of the Freeman and Tukey (1950) transformation Equation 13.8 given by Zar (2010):

$$p' = \tfrac{1}{2}[\arcsin\sqrt{(X/n + 1)} + \arcsin\sqrt{(X + 1/n + 1)}]$$

where X is the number of observations and n is the sample size for the terrace level group. Transformed proportions (p') were compared among the six groups by Tukey-type multiple comparison testing for significant differences between groups using contingency-table analysis (Zar, 2010).

RESULTS AND DISCUSSION

Sampled pedons will be discussed in reference to the several sampling locations shown in Fig. 2. The sampled pedons will be referenced by the names listed in Table 1. Additional data found in the appendices are referenced by complete pedon identification (ID) number.

Table 1. Pedon naming convention. Sampled pedons are listed by site and landscape position.

Pedon ID Number	Pedon Name	Pedon Landscape Position	Site Location
S11TX2890002	Pedon 2	Intermound Swale	T-2 Middleton Quad
S11TX2890003	Pedon 3	Pimple Mound Summit	T-2 Middleton Quad
S11TX2890004	Pedon 4	Intermound Swale	T-2 Middleton Quad
S11TX2897001	7001	Meander Ridge Edge	T-1 Stanmire Lake Quad
S11TX2897002	7002	Meander Ridge Summit	T-1 Stanmire Lake Quad
S11TX2897003	7003	Meander Ridge Edge	T-1 Stanmire Lake Quad
S11TX2897004	7004	Intermound Swale	T-1 Stanmire Lake Quad
S11TX2897005	7005	Pimple Mound Edge	T-1 Stanmire Lake Quad
S11TX2897006	7006	Pimple Mound Summit	T-1 Stanmire Lake Quad
S11TX2897007	7007	Pimple Mound Edge	T-1 Stanmire Lake Quad
S11TX2897008	7008	Intermound Swale	T-1 Stanmire Lake Quad
S11TX2897009	7009	Intermound Swale	T-1 Stanmire Lake Quad
S11TX2897010	7010	Intermound Swale	T-1 Middleton Quad
S11TX2897011	7011	Pimple Mound Edge	T-1 Middleton Quad
S11TX2897012	7012	Pimple Mound Summit	T-1 Middleton Quad
S11TX2897013	7013	Pimple Mound Edge	T-1 Middleton Quad
S11TX2897014	7014	Intermound Swale	T-1 Middleton Quad
S11TX2897015	7015	Intermound Swale	T-5 Leona Quad
S11TX2897016	7016	Pimple Mound Edge	T-5 Leona Quad
S11TX2897017	7017	Pimple Mound Summit	T-5 Leona Quad
S11TX2897018	7018	Pimple Mound Edge	T-5 Leona Quad
S11TX2897019	7019	Intermound Swale	T-5 Leona Quad
S11TX2897021	7021	Pimple Mound Edge	T-2 Middleton Quad
S11TX2897023	7023	Pimple Mound Edge	T-2 Middleton Quad
S11TX2897025	7025	Intermound	T-4 Lake Leon Quad
S11TX2897026	7026	Pimple Mound Edge	T-4 Lake Leon Quad
S11TX2897027	7027	Pimple Mound Summit	T-4 Lake Leon Quad
S11TX2897028	7028	Pimple Mound Edge	T-4 Lake Leon Quad
S11TX2897029	7029	Intermound	T-4 Lake Leon Quad

T-1 (Stanmire Lake Quad) Site

Table 2 provides selected morphological, physical and chemical characteristics of the soils sampled at the T-1 Site. Complete morphological descriptions are provided in Appendix A and complete physical and chemical data are provided in Appendix B. Figure 5 shows the orientation of the nine sampled pedons with respect to microtopography.

Morphology and Classification of Soils

Eight of the sampled pedons at this site have an ochric epipedon and an argillic horizon with a base saturation estimated to be greater than 35 percent at a depth of 180-200 cm which meets the criteria for Alfisols; these pedons include 7009, 7001, 7002, 7003, 7004, 7005, 7006, 7007. Pedon 7008 had a mollic epipedon over an argillic horizon and a high base saturation, and is therefore a Mollisol. The soil temperature regime for the study site is thermic with a mean annual air temperature of about 18.6° C. Soils are in both the udic and aquic soil moisture regimes and are quite heterogeneous with five great group classifications among the nine sampled pedons within a linear distance of 73 m. Great groups identified include Endoaqualfs, Epiaqualfs, Argiaquolls, Glossudalfs, and Hapludalfs.

The intermound swale pedon 7009 has an ochric epipedon to a depth of 55 cm, an argillic horizon from 55 to 173 cm, skeletans from 76 to 118 cm, and redoximorphic features throughout. The skeletans indicate that clay is eluviating from the Btg and B’t horizons and possibly accumulating in the lower portion of the B’t horizon. Soil

Table 2. Selected morphological, physical, and chemical characteristics of meander ridge, pimple mound, and intermound pedons of the T-1 (Stanmire Lake Quad) site. †

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
				Aquic Hapludalf: Intermound swale (7009)				
Ap	0-16	55.4	22.0	22.6	SCL	10YR 4/3	2MABK	5.4
A	16-36	56.0	21.6	22.4	SCL	10YR 4/2	2MABK	5.4
AB	36-55	54.8	21.5	23.7	SCL	10YR 5/2	2MSBK	5.5
Bt	55-76	52.2	19.1	28.7	SCL	10YR 4/3	2FABK	5.4
Btg	76-100	55.0	17.4	27.6	SCL	10YR 5/2	2MABK	5.1
B't	100-118	52.3	16.1	31.6	SCL	2.5YR 5/6	2MABK	4.9
B'tg	118-141	52.4	17.2	30.4	SCL	2.5Y 5/2	2MABK	4.9
BCtg	141-173	60.4	15.9	23.7	SCL	10YR 6/2	1MSBK	5.2
CBg	173-201	68.0	13.3	18.7	FSL	10YR 6/2	1COSBK	5.3
Cg1	201-226	84.9	4.9	10.2	LFS	10YR 6/2	0MA	5.7
Cg2	226-239	87.4	6.2	6.4	LFS	10YR 7/2	0SGR	6.2
				Aquic Glossudalf: Edge of meander ridge (7001)				
Ap	0-22	68.4	20.5	11.1	FSL	10YR 3/3	1MSBK	6.3
E	22-38	75.0	17.0	8.0	FSL	10YR 5/3	1MSBK	6.4
E/Bt	38-53	73.9	16.7	9.4	FSL	10YR 5/4	1MSBK	6.5
Btg1	53-77	47.8	12.2	40.0	SC	10YR 5/2	2MABK	5.8
Btg2	77-103	57.1	11.9	31.0	SCL	10YR 5/2	2MABK	5.4
Btg3	103-132	50.1	14.0	35.9	SC	10YR 5/2	2MABK	6.7
Btkg	132-152	53.4	13.8	32.8	SCL	10YR 6/2	1MABK	7.8
Btk1	152-171	50.0	17.4	32.6	SCL	2.5Y 5/3	1MABK	7.9
Btk2	171-184	64.1	12.2	23.7	SCL	10YR 5/6	1MABK	8.0
BCtg	184-206	71.5	9.0	19.5	FSL	10YR 6/2	1MABK	8.0
CBg	206-222	70.6	11.8	17.6	VFSL	10YR 6/1	1COSBK	8.1
Cg	222-267	91.6	4.6	3.8	FS	10YR 7/1	0SGR	7.5
				Typic Hapludalf: Summit of meander ridge (7002)				
Ap	0-21	71.8	19.3	8.9	FSL	10YR 4/2	1FSBK	5.8
A	21-32	75.2	17.3	7.5	VFSL	10YR 3/3	1FSBK	5.9
E1	32-45	78.3	16.4	5.3	LFS	10YR 5/3	1FSBK	6.1
E2	45-55	79.6	15.8	4.6	LFS	10YR 6/3	1FSBK	6.4
E3	55-67	79.2	16.4	4.4	LFS	10YR 5/3	1FSBK	6.1
E4	67-85	79.6	16.2	4.2	LFS	10YR 6/3	1FSBK	6.7
Bt	85-110	70.1	15.0	14.9	FSL	10YR 5/6	2MSBK	7.2
Btg1	110-135	60.2	10.9	28.9	SCL	10YR 5/2	2MABK	7.3
Btg2	135-159	50.2	11.0	38.8	SC	10YR 5/1	2MABK	7.8
B't1	159-195	53.5	12.4	34.1	SCL	10YR 5/4	2MABK	8.3
B't2	195-221	65.0	10.0	25.0	SCL	10YR 5/3	2MABK	8.3
BCt	221-251	76.0	7.0	17.0	VFSL	10YR 5/3	1MSBK	7.5
Cg	251-261	81.7	6.5	11.8	VFSL	10YR 7/1	0SGR	7.5

Table 2 Continued.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------	%	------------		(moist)		1:1
				Aquic Hapludalf: Edge of meander ridge (7003)				
Ap	0-16	60.7	21.4	17.9	FSL	10YR 3/2	1FSBK	6.7
A	16-29	64.4	19.6	16.0	FSL	10YR 4/2	2MSBK	7.2
E	29-44	77.2	16.9	5.9	LFS	10YR 5/3	1MSBK	7.4
Bt1	44-63	71.2	15.6	13.2	FSL	10YR 5/3	1MSBK	7.6
Bt2	63-96	56.8	13.0	30.2	SCL	10YR 5/3	2MABK	8.0
Bt3	96-125	47.9	12.5	39.6	SC	10YR 5/3	2MABK	7.9
Btk	125-144	53.7	12.0	34.3	SCL	2.5Y 5/6	2MABK	8.1
Btkg	144-175	53.5	13.4	33.1	SCL	2.5Y 6/1	2MABK	8.2
Btg1	175-198	52.8	16.0	31.2	SCL	2.5Y 6/1	2MABK	8.0
Btg2	198-220	65.5	12.5	22.0	SCL	2.5Y 6/2	2MABK	8.1
Btg3	220-238	67.6	13.2	19.2	VFSL	2.5Y 6/1	2MABK	8.2
BCtg	238-251	64.5	17.2	18.3	VFSL	2.5Y 6/1	2MABK	7.4
Cg	251-275	90.4	4.5	5.1	FS	2.5Y 6/2	0SGR	7.1
				Typic Endoaqualf: Intermound swale (7004)				
A	0-5	49.3	31.4	19.3	L	10YR 4/2	1FGR	5.3
Ap	5-23	56.3	23.5	20.2	SCL	10YR 4/2	2MSBK	5.6
BAg	23-39	47.1	23.1	29.8	SCL	10YR 4/2	2MSBK	6.0
Btg1	39-60	45.2	20.0	34.8	SCL	10YR 4/2	2MSBK	5.9
Btg2	60-74	49.8	19.8	30.4	SCL	10YR 4/2	2MABK	6.2
Btg3	74-98	48.4	20.0	31.6	SCL	2.5Y 4/2	2MABK	6.7
Btg4	98-125	49.1	18.3	32.6	SCL	2.5Y 5/2	2MABK	7.5
Btg5	125-146	52.3	17.0	30.7	SCL	2.5Y 6/2	2MSBK	7.7
Btg6	146-173	41.2	21.3	37.5	CL	10YR 6/2	2MSBK	7.6
Btg7	173-194	54.3	17.7	28.0	SCL	10YR 6/1	2MSBK	7.9
Btg8	194-218	63.1	13.6	23.3	SCL	2.5Y 6/2	2MSBK	8.1
BCg	218-262	76.9	8.8	14.3	VFSL	2.5Y 6/2	1MSBK	8.2
Cg	262-296	90.4	5.2	4.4	FS	10YR 7/1	0SGR	8.2
				Vertic Epiaqualf: Edge of pimple mound (7005)				
Ap	0-18	64.8	23.3	11.9	FSL	10YR 3/3	2MSBK	6.8
A	18-39	72.2	19.2	8.6	FSL	10YR 4/2	2MSBK	6.6
E	39-51	75.1	18.7	6.2	FSL	10YR 6/2	1FSBK	7.0
Btg	51-69	49.2	14.1	36.7	SC	10YR 4/2	2MABK	6.1
Btss	69-99	40.4	16.5	43.1	C	10YR 6/3	2MWEG	6.3
Bt	99-125	40.2	19.4	40.4	C	10YR 6/3	2MABK	7.6
Btk	125-143	47.2	19.5	33.3	SCL	10YR 6/3	2MSBK	8.0
Btkg1	143-183	43.7	19.3	37	CL	10YR 6/2	2MSBK	8.0
Btkg2	183-212	42.4	23.8	33.8	CL	10YR 6/1	1MSBK	8.0
Btkg3	212-230	46.8	20.4	32.8	SCL	2.5Y 7/2	1MSBK	8.0
CBg1	230-244	35.7	33.2	31.1	CL	5Y 7/1	0MA	8.0
CBg2	244-259	59.1	16.8	24.1	SCL	5Y 7/1	0MA	7.7
Cg	259-275	91.7	1.9	6.4	FS	2.5Y 7/2	0SGR	7.6

Table 2 Continued.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
		Aquic Arenic Hapludalf: Summit of pimple mound (S11TX2897006)						
Ap	0-17	75.9	19.2	4.9	LFS	10YR 4/3	1MSBK	5.5
A	17-39	75.9	18.8	5.3	LFS	10YR 4/3	2MSBK	5.4
E	39-55	76.6	18.9	4.5	LFS	10YR 5/3	1MSBK	6.0
Bt1	55-74	72.0	16.8	11.2	FSL	10YR 5/4	2MSBK	7.1
Bt2	74-111	41.4	15.2	43.4	C	2.5Y 5/3	2MABK	7.6
Btk1	111-141	54.9	14.3	30.8	SCL	10YR 5/3	2MABK	8.2
Btk2	141-152	53.3	13.8	32.9	SCL	10YR 5/3	2MSBK	8.2
Btk3	152-180	50.3	14.1	35.6	SC	2.5Y 6/3	2MSBK	8.2
BCtk	180-195	55.5	14.7	29.8	SCL	7.5YR 5/6	1MSBK	8.3
BCtg	195-219	61.3	15.5	23.2	SCL	10YR 6/2	1MSBK & 1TKPL	8.4
CBtg	219-242	67.6	12.9	19.5	FSL	10YR 6/2	1COSBK & 1TKPL	7.8
Cg	242-252	85.4	4.0	10.6	LFS	10YR 7/2	0SGR	8.1
C	252-285	90.5	1.3	8.2	FS	10YR 7/4	0MA	7.7
		Oxyaquic Vertic Glossudalf: Edge of pimple mound (S11TX2897007)						
Ap	0-21	77.0	18.1	4.9	LFS	10YR 4/2	1MSBK	5.9
A	21-31	75.0	16.9	8.1	FSL	10YR 5/3	1MSBK	7.1
Bt/E	31-48	68.5	15.4	16.1	FSL	10YR 6/3	2MSBK	7.2
Bt1	48-66	51.1	14.8	34.1	SCL	10YR 5/3	2MSBK	7.5
Bt2	66-87	42.8	14.6	42.6	C	2.5Y 6/3	1COSBK	7.8
Btss	87-120	42.8	15.6	41.6	C	2.5Y 6/3	2MWEG	7.9
Btssg	120-143	45.0	14.5	40.5	SC	2.5Y 6/2	2MWEG	7.9
B't	143-165	45.7	15.5	38.8	SC	2.5Y 6/3	2MSBK	7.9
Btg	165-186	48.0	15.7	36.3	SC	2.5Y 6/2	2MSBK	8.1
BCkg	186-205	49.2	17.6	33.2	SCL	2.5Y 6/1	1MSBK	8.1
CBkg	205-239	61.0	19.2	19.8	FSL	2.5Y 6/1	1MSBK	8.3
Cg1	239-262	75.1	14.1	10.8	FSL	2.5Y 7/1	0MA	8.3
Cg2	262-280	79.5	10.3	10.2	VFSL	2.5Y 7/1	0SGR	8.3
		Typic Argiaquoll: Intermound swale (S11TX2897008)						
Ap	0-19	49.6	26.5	23.9	SCL	10YR 3/2	2MSBK	5.6
A	19-39	39.2	25.8	35.0	CL	10YR 3/2	2MSBK	5.6
Btg1	39-58	48.2	22.4	29.4	SCL	10YR 4/2	1MABK	5.9
Btg2	58-78	52.5	19.9	27.6	SCL	10YR 5/2	2MABK	7.1
Btg3	78-102	49.2	18.9	31.9	SCL	10YR 5/2	2MABK	7.7
Btkg	102-132	50.3	17.1	32.6	SCL	10YR 6/2	2MABK	7.9
B'tg1	132-157	39.3	22.4	38.3	CL	10YR 6/2	2MABK	7.8
B'tg2	157-175	43.4	24.2	32.4	CL	10YR 7/1	2MSBK	7.6
B'tg3	175-191	64.7	15.3	20.0	FSL	10YR 6/6	1MSBK	7.7
Cg	191-230	92.2	1.4	6.4	FS	10YR 7/2	0SGR	7.6

† Horizon designation and coding according to Schoeneberger et al. (2002).

‡ Soil texture: C, clay; CL, clay loam; FS, fine sand; FSL, fine sandy loam; LFS, loamy fine sand; SC, sandy clay; SCL, sandy clay loam; VFSL, very fine sandy loam.

†† Soil matrix color identified by Munsell ® color notation.

§ Soil structure: Grade - 0 , structureless; 1, weak; 2, moderate; Size - F, fine; M, medium; CO, coarse; TK, thick; Type - ABK, angular blocky; GR, granular; MA, massive; PL, platy; SBK, subangular blocky; SGR, single grain; WEG, wedge.

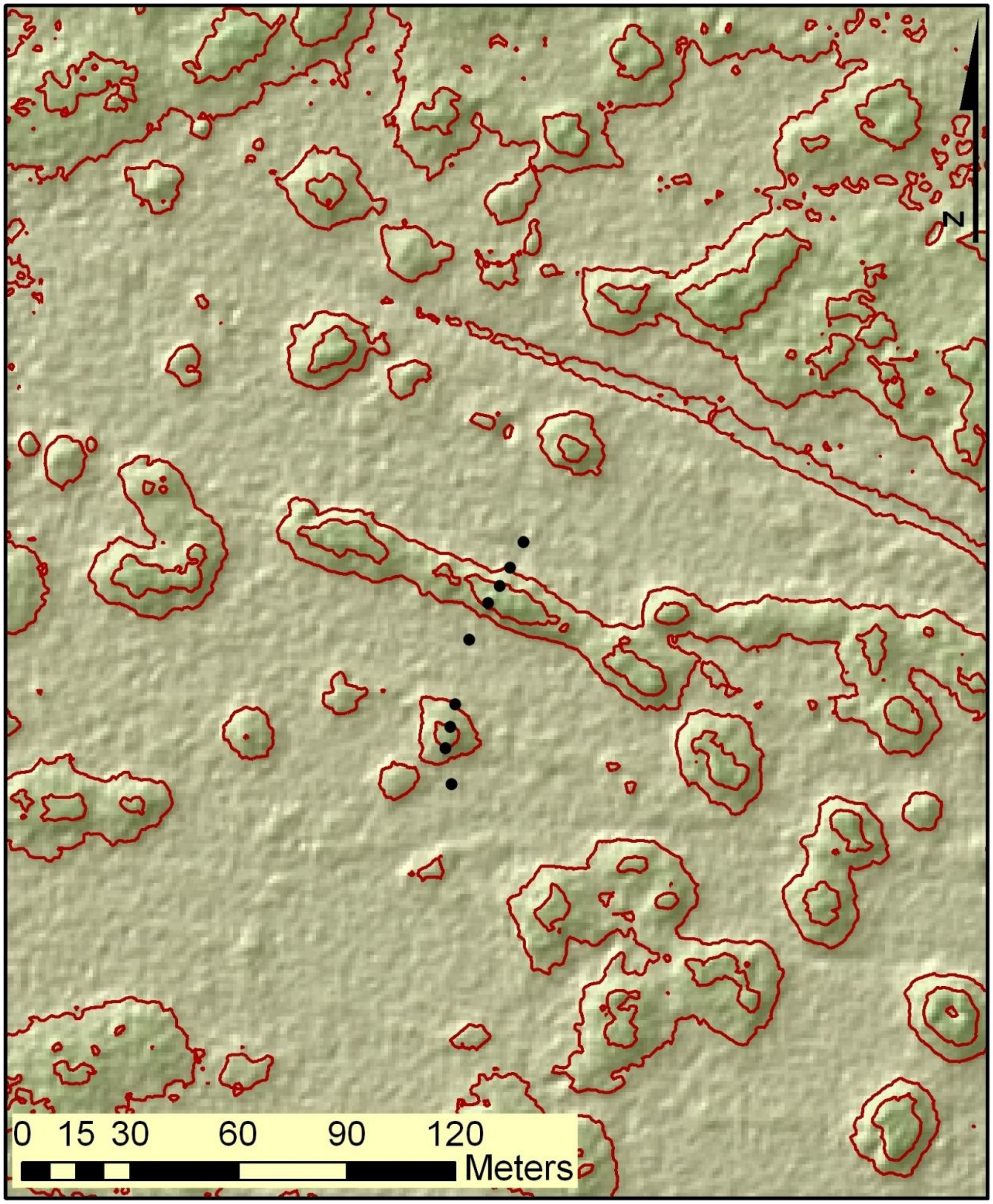


Fig. 5. Shaded relief image of T-1 (Stanmire Lake Quad) Site at 1:2,500 scale. Contour lines (red) and locations of the nine sampled pedons (black circles) are indicated. Contour interval of 30 cm.

structure was well developed throughout and changes from angular blocky to subangular blocky at a depth of 141 cm. The underlying sediments (201 to 226 cm) are structureless massive stratified loamy fine sand and fine sand, and from a depth of 226 cm to the depth of sampling is structureless single grain loamy fine sand. The soil does not meet requirements for the aquic soil moisture regime according to soil taxonomy because it does not contain more than 50 percent redox depletions of chroma 2 or less within the upper 12.5 cm of the argillic horizon; it is therefore in the udic soil moisture regime which meets the criteria for the Udalfs. The presence of four percent grayish brown (10YR 5/2) iron depletions and aquic conditions in normal years within 75 cm of the soil surface meet the criteria for Aquic Hapludalfs. The particle-size control section from 55 to 105 cm averages 28.5 percent clay by weight and more than 15 percent of the particles are fine sand or coarser; therefore, the particle-size class is fine-loamy. Mineralogy class and cation-exchange activity class were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils that have a higher clay content. Pedon 7009 is classified as a fine-loamy, siliceous, active, thermic Aquic Hapludalf and is similar to the Yeaton soil series which is typically found on Pleistocene-age marine terraces of the Gulf Coast Prairie in Southeast Texas. The typical pedon for Yeaton is found near Dayton in Liberty County, Texas.

The meander ridge edge pedon 7001 has an ochric epipedon to a depth of 38 cm, a glossic horizon from 38-53 cm, an argillic horizon from 53-206 cm, redoximorphic features throughout the profile below a depth of 22 cm, sand coats from 103-132 cm, and secondary carbonates from 132-184 cm. The sand coats may be skeletans, indicating that clay is being eluviated to lower horizons following periods of saturation. This however is not supported by a clay decrease in the Btg3 horizon, but the clay increase in the Btg2 may be in part a relic of the depositional environment. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the BCtg horizon at a depth of 184 cm. The underlying C horizon is stuctureless single grain fine sand at a depth of 222 cm. This soil is in the udic soil moisture regime and meets the criteria of Udalfs. The presence of a glossic horizon, a reduced matrix color of grayish brown (10YR 5/2) and aquic conditions for sometime in normal years in the upper 25 cm of the argillic horizon meet the criteria for Aquic Glossudalfs. The particle-size control section from 53-103 cm averages 35.3 percent clay by weight, so the particle-size class is fine. Mineralogy class was not determined for this soil. However, indications in surrounding soils with higher clay content suggest smectitic mineralogy. Therefore, the soil is classified as a fine, smectitic, thermic Aquic Glossudalf and is similar to the Rodessa soil series which is typically found on pimple mounds on nearly level uplands and terraces of Coastal Plain Sediments in Northeast Texas. The typical pedon for Rodessa is found near Clarksville in Red River County, Texas.

The meander ridge summit pedon 7002 has an ochric epipedon to a depth of 85 cm, an argillic horizon from 85-251 cm, and redoximorphic features below a depth of 21 cm. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the BCt horizon at a depth of 221 cm. The underlying sediments are stuctureless single grain very fine sandy loam at a depth of 251 cm. This soil is in the udic soil moisture regime which meets the criteria for the Udalfs. The soil does not meet the criteria for any other Udalfs, and therefore classifies as Typic Hapludalfs. The particle-size control section from 85-135 cm averages 21.9 percent clay content by weight, therefore the particle-size class is fine-loamy. Mineralogy class and cation-exchange capacity were not determined for this soil, but Pedon 7002 is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils that contain a higher clay content. Therefore, the soil is classified as a fine-loamy, siliceous, active, thermic Typic Hapludalf and is similar to the Austonio soil series typically found on Pleistocene-age terraces in East Texas. The typical pedon for Austonio is found on a Trinity River terrace near Austonio in Houston County, Texas.

The meander ridge edge pedon 7003 has an ochric epipedon to a depth of 44 cm, an argillic horizon from 44-251 cm, skeletans from 63-125 cm, and redoximorphic features below a depth of 16 cm. The skeletans indicate that clay is being eluviating from the Bt2 and Bt3 horizons accumulating in the lower portion of the Bt3 horizon. Soil structure was well developed throughout and changes from angular blocky to subangular blocky at a depth of 198 cm in the Btg2 horizon. The underlying C material is structureless single grain fine sand. The soil is in the udic soil moisture regime which meets the criteria for the Udalfs. The presence of five percent grayish brown (10YR 5/2) iron depletions and aquic conditions in normal years within the upper 25 cm of the argillic horizon meet the criteria for Aquic Hapludalfs. The particle-size control section from 44-94 cm averages 23.7 percent clay content by weight and more than 15 percent of the particles are fine sand or coarser, giving a particle-size class of fine-loamy. Mineralogy class and cation-exchange were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is most likely active or superactive given the indications of smectitic mineralogy in surrounding soils that contain a higher clay content. This soil is classified as a fine-loamy, siliceous, active, thermic Aquic Hapludalf and is similar to the Yeaton soil series which is typically found on Pleistocene-age marine terraces of the Gulf Coast Prairie in Southeast Texas. The typical pedon for Yeaton is found near Dayton in Liberty County, Texas.

The intermound swale pedon 7004 has an ochric epipedon to a depth of 39 cm, an argillic horizon from 39-218 cm, and redoximorphic features below a depth of 23 cm. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the Btg7 horizon at a depth of 173 cm. The soil features a loam surface 5 cm thick that appears to be deposited from sediments originating on one of the surrounding mounds or ridges. The material below 262 cm is stuctureless single grain fine sand. This soil is in an aquic soil moisture regime meeting the criteria for Aqualfs. The soil does not meet the criteria for any other Aqualfs, and therefore classifies to the Typic Endoaqualfs. The particle-size control section from 39-89 cm averages 32.6 percent clay content by weight and more than 15 percent of the particles are fine sand or coarser so the particle-size class is fine-loamy. Mineralogy class and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction therefore the mineralogy class is likely siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils that contain a higher clay content. Classification of this soil is fine-loamy, siliceous, active, thermic Typic Endoaqualf and is not similar to any established soil series.

The pimple mound edge pedon 7005 has an ochric epipedon to a depth of 51 cm, an argillic horizon from 51-230 cm, slickensides from 69-99 cm, secondary carbonates from 125-230 cm, and redoximorphic features throughout. Soil structure changes from angular blocky to wedge in the argillic horizon before returning to angular blocky and then subangular blocky in the Btk horizon at a depth of 125 cm. Underlying material at a depth of 259 cm is stuctureless single grain fine sand. This soil is in the aquic soil moisture regime which meets the criteria for the Aqualfs. The presence of episaturation and vertic properties from a depth of 69-99 cm meets the criteria for Vertic Epiaqualfs. The particle-size control section from 51-101 cm averages 40.7 percent clay content by weight, therefore the particle-size class is fine. Mineralogy class was not determined for this soil. However, this soil is expected to be smectitic given the indications of smectitic mineralogy in the features of this soil. Therefore, the soil is classified as a fine, smectitic, thermic Vertic Epiaqualf and is not similar to any established soil series.

The pimple mound summit pedon 7006 has an ochric epipedon to a depth of 55 cm, an argillic horizon from 55-242 cm, skeletans from 55-74 cm and from 111-152 cm, pressure faces on the top of peds from 74-111 cm, and redoximorphic features below a depth of 39 cm. The Bt1 horizon, which contains skeletans, appears to be eluviating clay into the Bt2 horizon which has a sharp clay increase and pressure faces indicating smectitic mineralogy. The Btk1 and Btk2 horizons also contain skeletans and appear to be eluviating clay along ped faces into the Btk3 horizon which has a sharp increase in clay content. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the Btk2 horizon at a depth of 141 cm. The weak platy structure observed in the BCtg and CBtg horizons may be associated with sodicity from endosaturation. While full chemical characterization was not completed on this pedon, a pH value of 8.4 in the BCtg horizon is attributed to exchangeable sodium. Alternately, the weak platy structure could be inherited from bedding planes. The underlying material is stuctureless single grain loamy fine sand at a depth of 242 cm overlying and structureless massive fine sand at 252 cm. The structureless massive condition of this fine sand may be associated with sodicity as well. This soil has an udic soil moisture regime so is an Udalf. The soil has five percent dark grayish brown (10YR 4/2) and 10 percent light brownish gray (10YR 6/2) iron depletions in the Bt1 horizon within 75 cm of the soil surface and meets sandy particle-size class criteria throughout a layer from the surface to the top of the argillic horizon, and therefore classifies to the Aquic Arenic Hapludalfs. The particle-size control section from 55-105 cm averages 31.2 percent clay content by weight and more than 15 percent of the particles are fine sand or coarser so the particle-size class is fine-loamy. Mineralogy class and cation-exchange capacity class were not determined for this soil.

However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is most likely active or superactive given the indications of smectitic mineralogy in surrounding soils that have a higher clay content. Pedon 7006 is classified as a fine-loamy, siliceous, superactive, thermic Aquic Arenic Hapludalf and is not similar to any established soil series.

The pimple mound edge pedon 7007 has an ochric epipedon to a depth of 31 cm, a glossic horizon from 31-48 cm, an argillic horizon from 31-186 cm, episaturation from 66-87 cm, redoximorphic features below a depth of 22 cm to 87 cm, and below a depth of 120 cm, slickensides from 87-143 cm, and secondary carbonates from 186-239 cm. The lack of redoximorphic features from 87-120 cm immediately below the water saturated Bt2 horizon is attributed to this horizon serving as a restriction to water movement. Soil structure changes from subangular to angular blocky in the argillic horizon then to wedge structure and finally returns to subangular blocky in the B’t horizon at a depth of 143 cm and directly underlying a layer of clay accumulation and slickensides. Beginning at 239 cm, the underlying material is stuctureless massive fine sandy loam and becomes structureless single grain very fine sandy loam at a depth of 262 cm. This soil is in the udic soil moisture regime so is an Udalf. The presence of a glossic horizon, water saturated layer from 66-87 cm, and slickensides and wedge-shaped peds within 125 cm of the surface meet the criteria for Oxyaquic Vertic Glossudalfs. The particle-size control section from 31-81 cm averaged 30.5 percent clay so the particle-size class is fine-loamy. Mineralogy class and cation-exchange capacity class were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is considered siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils that contain higher clay content. The soil classifies as a fine-loamy, siliceous, superactive, thermic Oxyaquic Vertic Glossudalf and is not similar to any established soil series.

The final pedon at this site was the intermound swale pedon 7008. This pedon did not classify as an Alfisol as it has a mollic epipedon to a depth of 39 cm, an argillic horizon from 39-191 cm, redoximorphic features throughout, skeletans from 39-102 cm, and secondary carbonates from 102-132 cm. The Btg1, Btg2, and Btg3 horizons contain skeletans and appear to be eluviating clay into the Btkg or B’tg1 horizon as indicated by a clay increase. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the B’tg2 horizon at a depth of 157 cm. The underlying material is stuctureless single grain fine sand beginning at a depth of 191 cm. This soil has a mollic epipedon and meets the criteria for Mollisols. It has an aquic soil moisture regime so is an Aquoll. Pedon 7008 has an argillic horizon so classifies to the Typic Argiaquolls. The particle-size control section from 39-89 cm averages 29.2 percent clay by weight and more than 15 percent of the particles are fine sand or coarser so the particle-size class is fine-loamy. Mineralogy class and cation-exchange capacity were not determined for this soil. However, the soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is considered to be siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils that contain higher clay content. Pedon 7008 is a fine-loamy, siliceous, active, thermic Typic Argiaquoll and is not similar to any established soil series.

Endosaturation and Episaturation

Figure 6 details the soil profiles of the T-1 (Stanmire Lake Quad) Site relative to elevation with special emphasis given to reduced matrix colors or gleyed horizons. Two of the three intermound pedons (7004 and 7008) exhibited characteristics indicative of saturation in normal years within 50 cm of the soil surface. Characteristics identified include gleyed horizons (soil matrix colors of chroma 2 or less) and alkaline pH values within 100 cm of the soil surface. The pH values are high relative to the average annual precipitation and climate of the study area and potential for leaching in these very deep soils. Topography of these soils relative to groundwater explains the neutral to alkaline pH values that are common in the lower horizons of most pedons at this site. These values are attributed to movement of bases associated with a fluctuating water table where bases move to the upper capillary zone above the water table.

The lowest intermound pedon (7009) relative to elevation, did not exhibit the same neutral to alkaline pH in its lower horizons. Throughout this pedon pH values were < 6.2 which may indicate a general lack of long term endosaturation within 239 cm of the surface, but the presence of gleyed horizons below a depth of 118 cm indicate water saturation at or below that depth. The lack of extended periods of endosaturation in pedon 7009 may be associated with an adjacent drainageway that can be observed

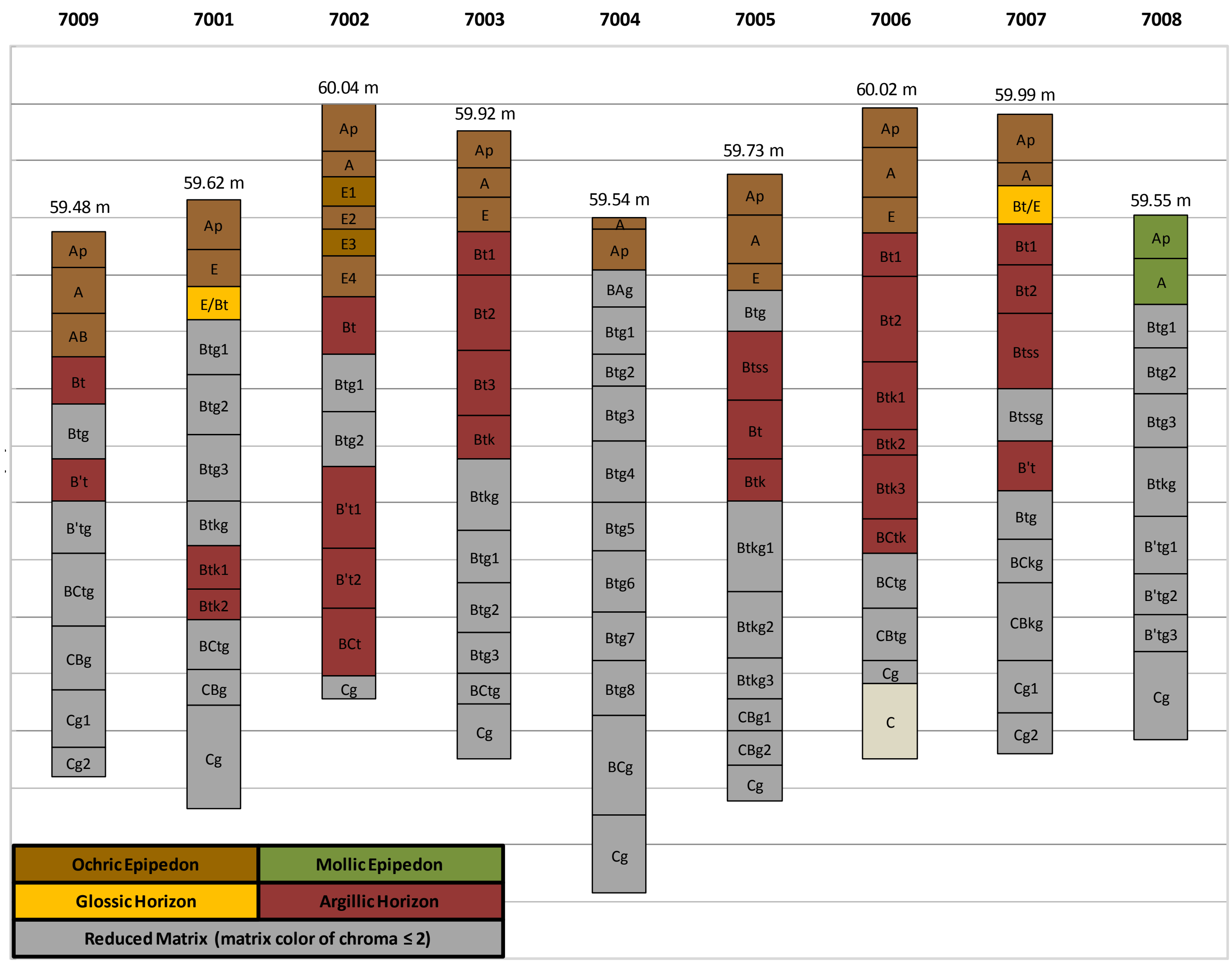


Fig. 6. Observed soil horizons by pedon relative to elevation at T-1 (Stanmire Lake Quad) Site. Vertical axis interval is 25 cm.

across the upper portion of Fig. 5 extending in a northwest to southeast trend at the site. While the drainageway is only slightly lower in topography than pedon 7009, it is such that preferential ground water movement may be associated with this feature located at a lower elevation.

Several pedons provide evidence that suggests a periodic presence of perched water tables. Pedons 7009, 7001, 7002, 7005, and 7007 exhibits several characteristics indicative of periodic episaturation to include: a substantial increase in clay content below or at the depth of a gleyed horizon, a soil structural change below a gleyed horizon, skeletans on the vertical faces of peds, redoximorphic soil colors, and a more acidic soil pH then that of adjacent soil horizons. The presence of skeletans is indicative of the translocation of clay into lower horizons in a soil, but the presence of skeletans together with acidic soil pH in a dry state may also be indicative of an acidifying process of ferrolysis during periodic wetting and drying cycles.

Pedon 7009 may perch water in association with an absolute clay increase of 4% at a depth of 100 cm. A gleyed horizon, the presence of skeletans on vertical faces of peds, more acidic pH values than adjacent horizons, and other redoximorphic features were described at a depth of 76-100 cm.

The presence of a glossic horizon from 38-53 cm in pedon 7001 is indicative of possible episaturation and degradation of an argillic horizon in the past. The absolute clay increase of 30.6% at 53 cm together with reduced matrix colors and redoximorphic features provides evidence of a possible zone of episaturation from 53-103 cm. At this depth more acidic pH values attributed to ferrolysis are noted.

Gleyed horizons from 110-159 cm in pedon 7002 together with a substantial clay increase provide evidence of potential episaturation, but the neutral to alkaline pH values indicate periods of endosaturation associated with fluctuating groundwater tables.

While pedon 7004 has reduced matrix colors throughout the soil profile below a depth of 23 cm, a clay increase of 5% absolute at 39 cm together with a slightly more acidic pH is evidence of a periodic zone of episaturation from 23-60 cm.

Pedon 7005 shows evidence of perching water periodically at a depth of 69 cm. From 51-69 cm a gleyed horizon is associated with a 6.4% increase in clay content and soil structure change at a depth of 69 cm. Skeletans on the vertical faces of peds and redoximorphic features are present from 51-69 cm. From 69-99 cm pedogenic slickensides and wedge shaped peds have formed which limit the movement of water.

An absolute clay increase of 32.2% at a depth of 74 cm in pedon 7006, together with the presence of skeletans on the vertical faces of peds, and other redoximorphic features indicate periodic perching of water from 55-74 cm. Associated with the clay increase is a structural change from subangular blocky to angular blocky with pressure faces on the tops of peds. This soil structure change also contributes to perching of water.

Pedon 7007 was water saturated at a depth of 66-87 cm at the time of sampling on May 12, 2011. This zone of episaturation is most likely associated with increased clay content and soil structure. Pedogenic slickensides and wedge shaped peds have formed in conjunction with the clay content increase from 87-165 cm. Despite indicators pointing to episaturation in many of the sampled pedons, only 7007 exhibited a water saturated condition at the time of sampling. This condition was not expected due to drought conditions affecting the study site at that time, but the site had recently received some limited precipitation that was perched above the structural change at 87 cm. This perched water may also indicate lateral movement of water from the summit to the edge above a water restrictive layer. Skeletans were not observed in the zone of episaturation possibly due to the saturated condition of the soil. Skeletans were observed on the vertical faces of peds from 87-120 cm.

Depositional Environment

The heterogeneity of these soils can be attributed to the variability of the fluvial depositional environments in the past. At the time of floodplain formation, the paleoriver may have experienced intense periods of avulsion followed by a return to near its once abandoned channel. These periods of oscillation between a coarser-textured depositional environment and a finer-textured depositional environment can be correlated to Fig. 7 and 8. The sand and silt fraction of all pedons are poorly sorted throughout the zone of vertical accretion (Fig. 8) which is indicative of a fluvial origin.

The intermounds exhibit a somewhat uniform depositional environment of over bank deposits (vertical accretion) from flood events. Due to their topographic position major flood events are expected to drape the intermounds with fine sediments which remain in suspension and deposit preferentially in lower positions where water ponds. This provides a distribution of clays, silts, and fine sands across the intermound surface

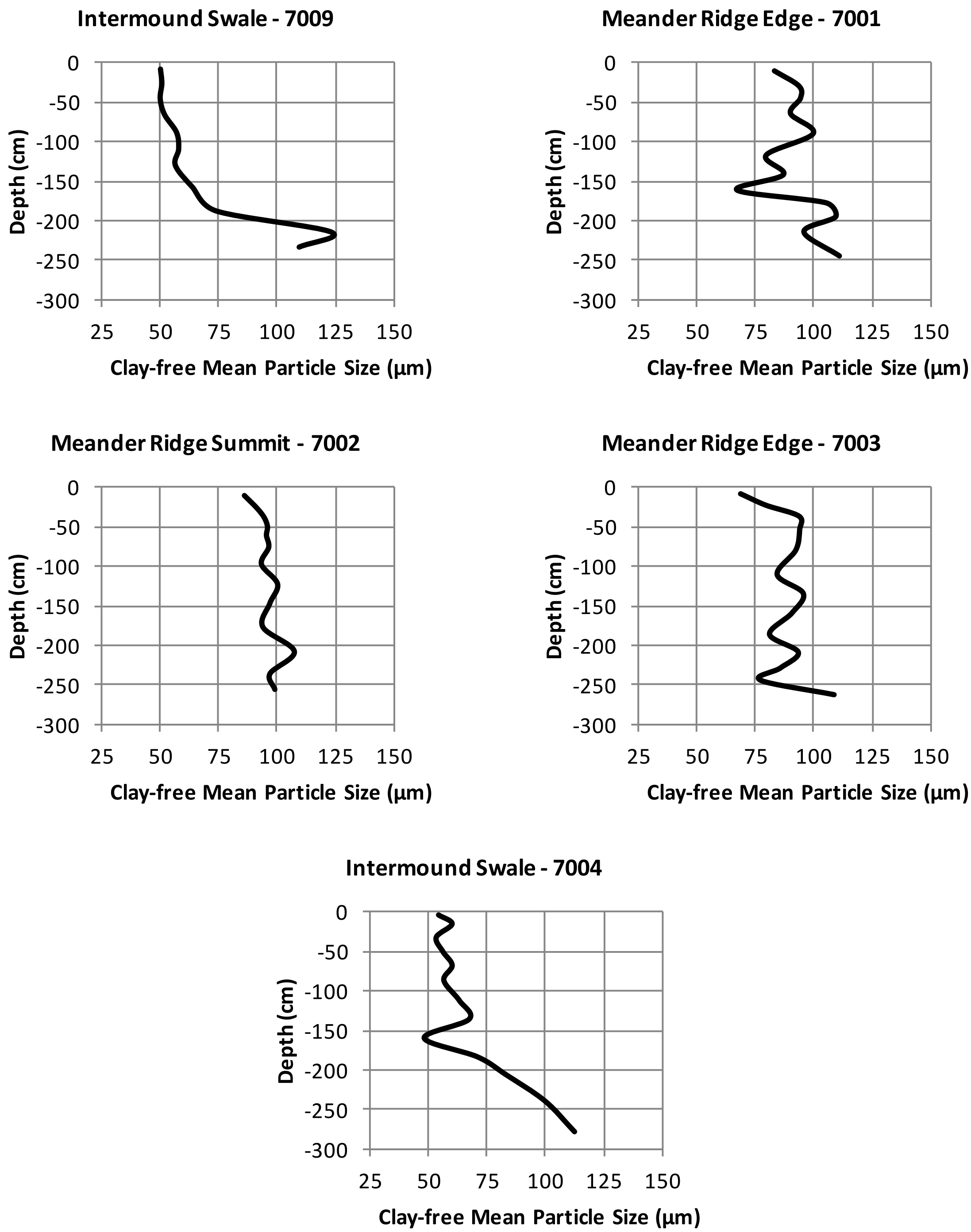
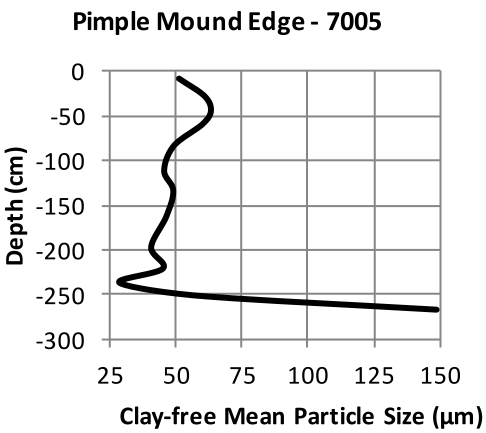
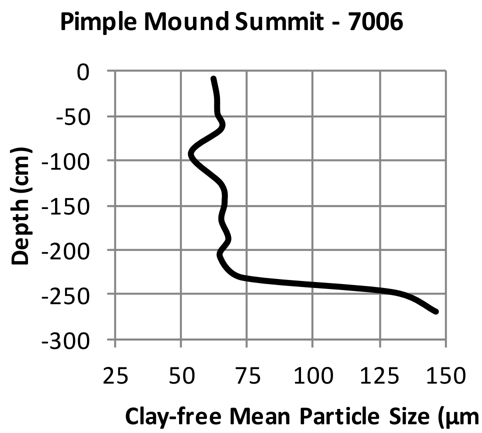
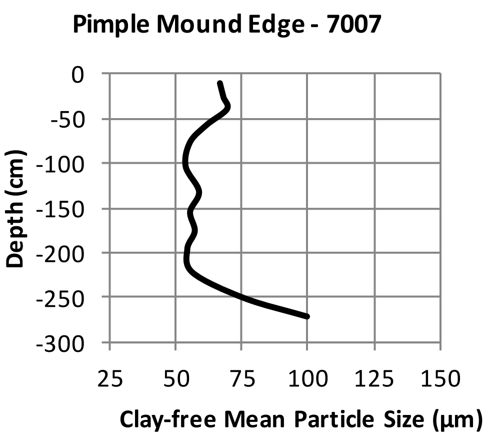


Fig. 7. Clay-free mean particle size (2-2000 µm fraction) with depth for the study soils at the T-1 (Stanmire Lake Quad) Site. Pedons identified in relation to accretion ridge, pimple mound, and intermound landscape positions.







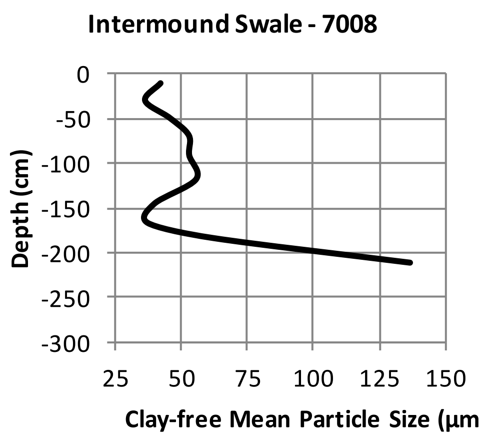


Fig. 7 Continued.

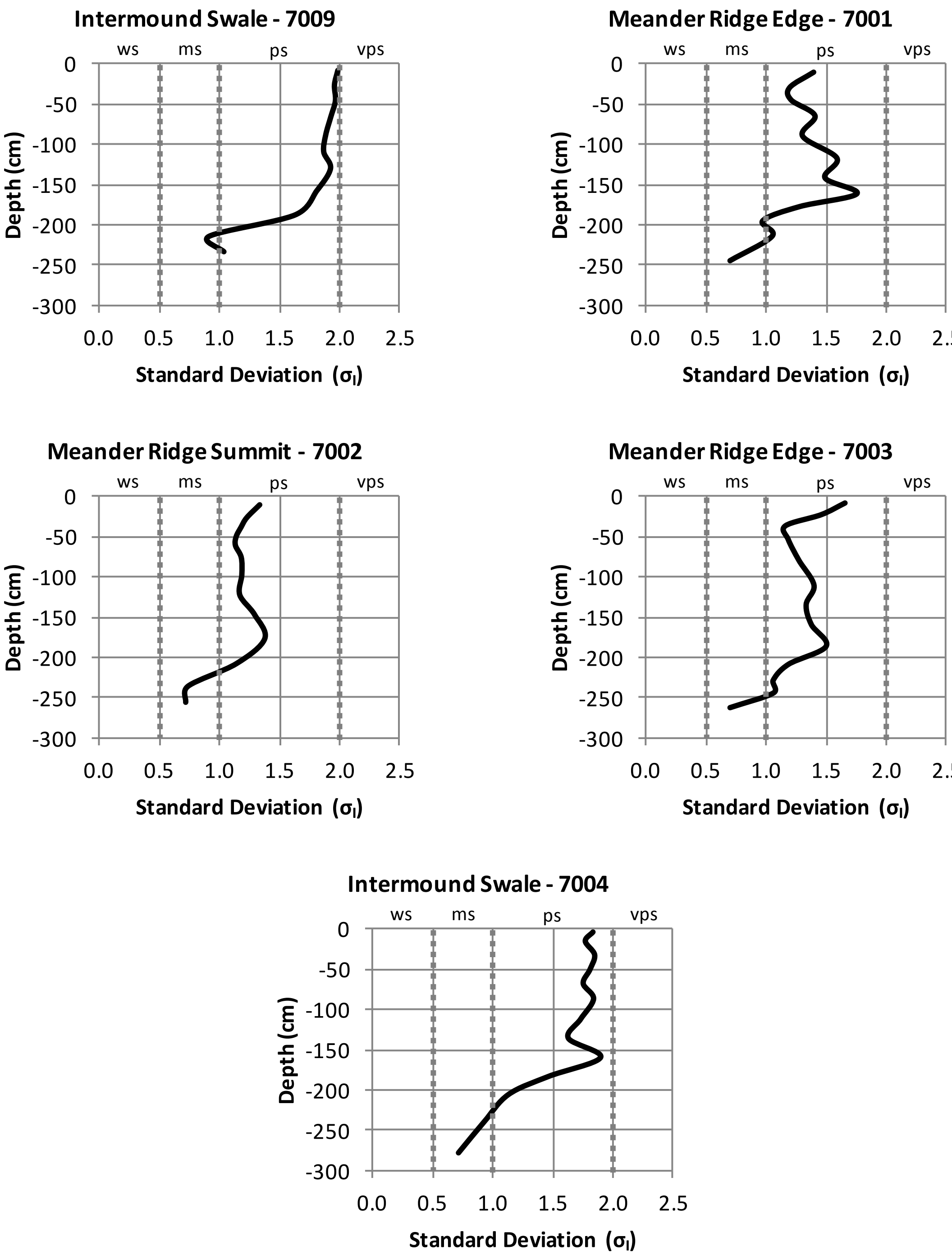


Fig. 8. Clay-free standard deviation of particle size distribution with depth for the study soils at the T-1 (Stanmire Lake Quad) Site. Letters along the top margin give verbal limits for standard deviation: ws, well sorted; ms, moderately sorted; ps, poorly sorted; vps, very poorly sorted. Pedons are identified in relation to meander ridge, pimple mound, and intermound positions.

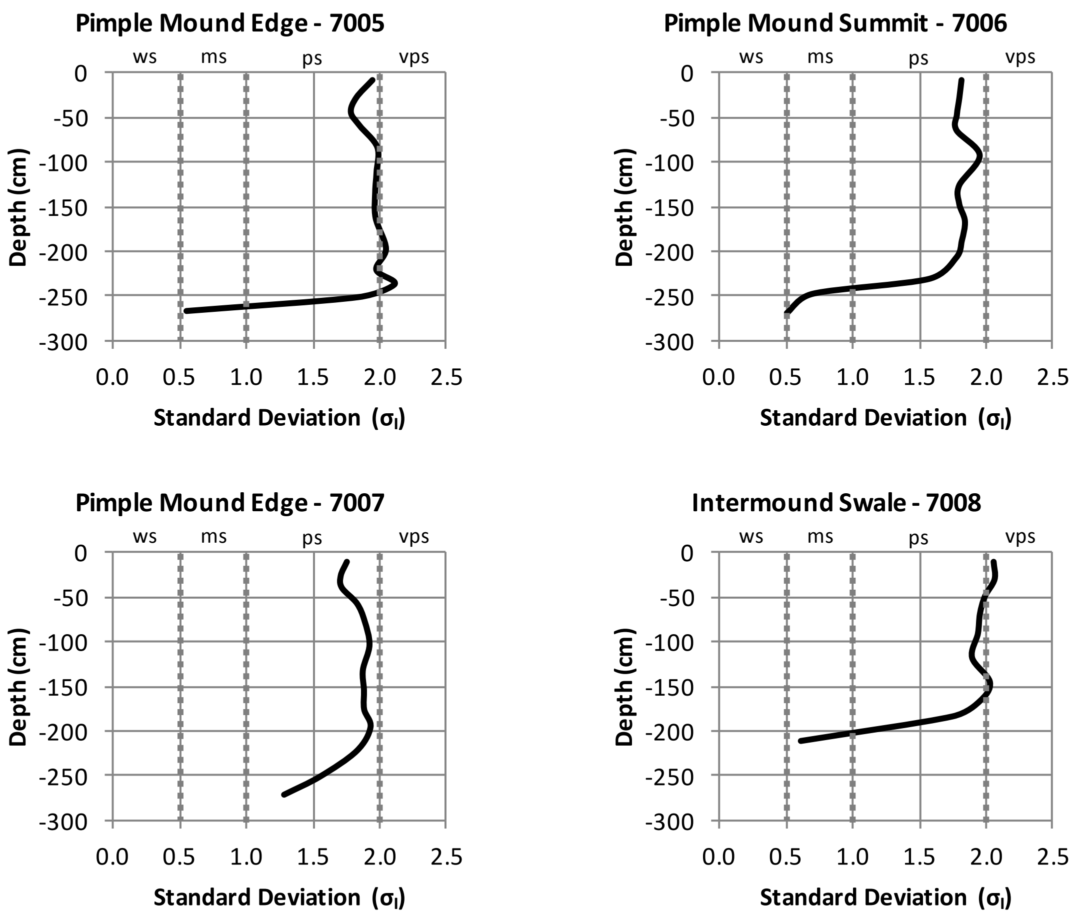


Fig. 8 Continued.

with depth. This is expressed as finer surface textures of intermounds relative to mounds and ridges.

The summits of the meander ridge and pimple mound exhibit a fining upward trend and a uniform depositional environment similar to the intermound, but with coarser sediments. However, the edges appear to contrast the depositional environment of the intermounds and summit positions, but such can be explained and may provide clues to the depositional environment and subsequent erosional environment in the past.

Coarser sediments originally deposited at the summit position may have been eroded by wind, water, or biotic activity and deposited along the edges. During major flood events fine sediments are deposited most often along the edges and in the intermounds with few events topping the summit position. This coupled with deposition from the summit makes for a complex sedimentation environment at the edge of the mounds and ridges. While some erosional sediment from the mounds and ridges are deposited in the intermounds, these additions are masked by the overriding addition of clays and silts from flooding. This explains the uniform fining upward sequence observed in intermounds and summit positions in contrast to the fluctuations observed in the edges of the mound and ridge.

Zone of Lateral Accretion

Further evidence of fluvial origin for the ridge and mound is observed in Fig. 9 when the soil surface is compared to the top of materials deposited by lateral accretion. This relationship indicates that mounds and ridges are residual components of accretion

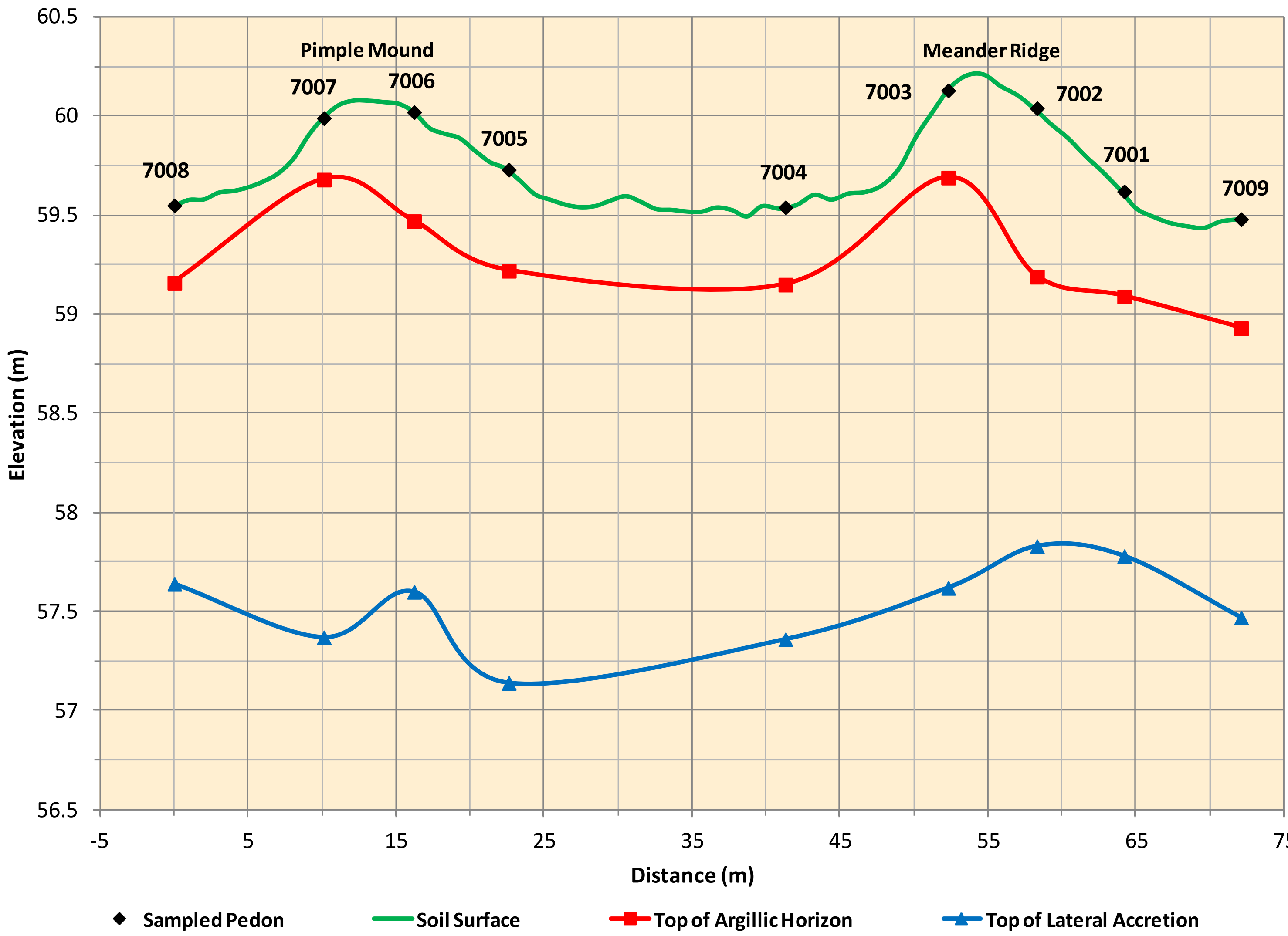


Fig. 9. Relation of lateral accretion to modern topography at T-1 (Stanmire Lake Quad) Site.

ridges on point bar deposits associated with the meandering of the paleoriver. While some clay and silt size particles were deposited during the stage of a lateral accretion depositional environment, most of the fine particles in this system came after the river's slow retreat, or major avulsion, during vertical accretion.

Determining the depth at which vertical accretion began and lateral accretion ended is not simple given the dynamic nature of rivers and fluvial environments. The determination considered the clay-free mean particle size, total sand content, and sorting. The degree of sorting quantified by standard deviation of clay-free sediments was given the greatest weight.

The coarser sediments of the zone of lateral accretion were deposited in a higher velocity depositional environment than the overbank deposits in the zone of vertical accretion. At this site poorly sorted sediments with a standard deviation greater than 1.0are attributed to the zone of vertical accretion; while moderately sorted sediments with a standard deviation of less than 1.0 are assigned to the zone of lateral accretion.

Lateral accretion in pedon 7009 begins at a depth of 201 cm and the top of the Cg1 horizon. Indications supporting this conclusion include an increase in total sand from 68.0 to 84.9 percent, a coarsening of the clay-free mean particle size from 73.9 to 123 µm, and transition from poorly sorted sediments (standard deviation of 1.6) to moderately sorted sediments (standard deviation of 0.9).

The zone of lateral accretion in pedon 7001 begins at a depth of 184 cm and the top of the BCtg horizon. Indications supporting this conclusion include an increase in total sand from 64.1 to 71.5 percent, a coarsening of the clay-free mean particle size from 105 to 109 µm, and transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.7). This pedon appears to have active pedogenesis influencing the former point bar deposits in the zone of lateral accretion.

The zone of lateral accretion in pedon 7002 begins at a depth of 221 cm and the top of the BCt horizon. Indications supporting this conclusion include an increase in total sand from 65.0 to 76.0 percent and a transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.7). The clay-free mean particle size was not used as an indicator in this pedon with deference given to the degree of sorting (standard deviation) because it appears that in the summit position of the meander ridge that the sand and silt size particles are largely homogenous with regard to the mean value. It may also be that the B’t2 horizon, with a clay-free mean particle size of 107 µm is transitional to the zone of lateral accretion in the BCt horizon, with a clay-free mean particle size of 97.2 µm.

The zone of lateral accretion in pedon 7003 begins at a depth of 251 cm and the top of the Cg horizon. Supporting this are an increase in total sand from 64.5 to 90.4 percent, coarsening of the mean particle size from 77.0 to 109 µm, and a transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.7).

The zone of lateral accretion in pedon 7004 begins at a depth of 218 cm and the top of the BCg horizon. This is supported by an increase in total sand from 63.1 to 76.9 percent, coarsening of the mean particle size from 83 to 100 µm, and transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.9). This pedon shows active pedogenesis influencing the former channel or point bar deposits in the zone of lateral accretion.

The zone of lateral accretion in pedon 7005 begins at a depth of 259 cm and the top of the Cg horizon as indicated by an increase in total sand from 59.1 to 91.7 percent, a coarsening of the mean particle size from 58.5 to 149 µm, and a transition from poorly sorted sediments (standard deviation of 1.8) to moderately sorted sediments (standard deviation of 0.6).

Lateral accretion in pedon 7006 begins at a depth of 242 cm and the top of the Cg horizon where an increase in total sand (from 67.6 to 85.4 percent), a coarsening of the mean particle size (73.1 to 130 µm), and a transition from poorly sorted sediments to moderately sorted sediments occurs.

The lateral accretion zone in pedon 7007 begins at a depth of 262 cm and the top of the Cg2 horizon. Data supporting this conclusion include coarsening of the mean particle size from 96.2 to 102 µm and a decrease in standard deviation from 1.6 to 1.3. The depth of sampling in this pedon may not include the zone of lateral accretion, but rather a transitional zone. Sampling below a depth of 280 cm may provide coarser sediments correlating with other sampled pedons at this site.

The zone of lateral accretion in pedon 7008 begins at a depth of 191 cm and the top of the Cg horizon. Supporting this conclusion is an increase in total sand (64.7 to 92.2 percent), a coarsening of the mean particle size (62.2 to 137 µm), and a transition from poorly sorted sediments to moderately sorted sediments.

Upper Keechi Creek Paleoriver

The soils of the T-1 (Stanmire Lake Quad) sampling site formed at a time in which an older T-1 terrace of slightly higher elevation separated the younger T-1 surface of the sampling site laterally from what would have been a Trinity Paleoriver meandering along its then eastern flood plain (Fig. 10). Therefore the meander ridge and pimple mound sampled at this site actually formed in the meander belt deposits of a tributary of the Trinity River, the flood plain of which is now served by the Upper Keechi Creek. At the time of deposition the paleoriver was migrating in a northeasterly direction before abruptly retreating sometime after reaching a channel position that may have followed the black line in Fig. 11 near what is now a drainageway due east of pedon 7009. The retreat of this paleoriver may have been a down cutting into the modern Upper Keechi Creek floodplain represented by the Holocene loamy alluvium deposits in Fig. 10 or a migration to the T-1 surface delineated in red.

This down cutting may have been associated with a change in climate and decreased precipitation as the depositional environment of the pimple mound pedons and adjacent intermounds appears to have been one of greater water velocity than that of the meander ridge. These observations are made in relation to what are generally coarser clay-free mean particle size values in pedons 7005-7008 and finer sediments in pedons 7001-7004 and 7009. The meander ridge is associated with the final stages of deposition prior to a major avulsion. Further, the watershed may have undergone a period of drought which was subsequently followed by a period of intense water flow and the avulsion event.

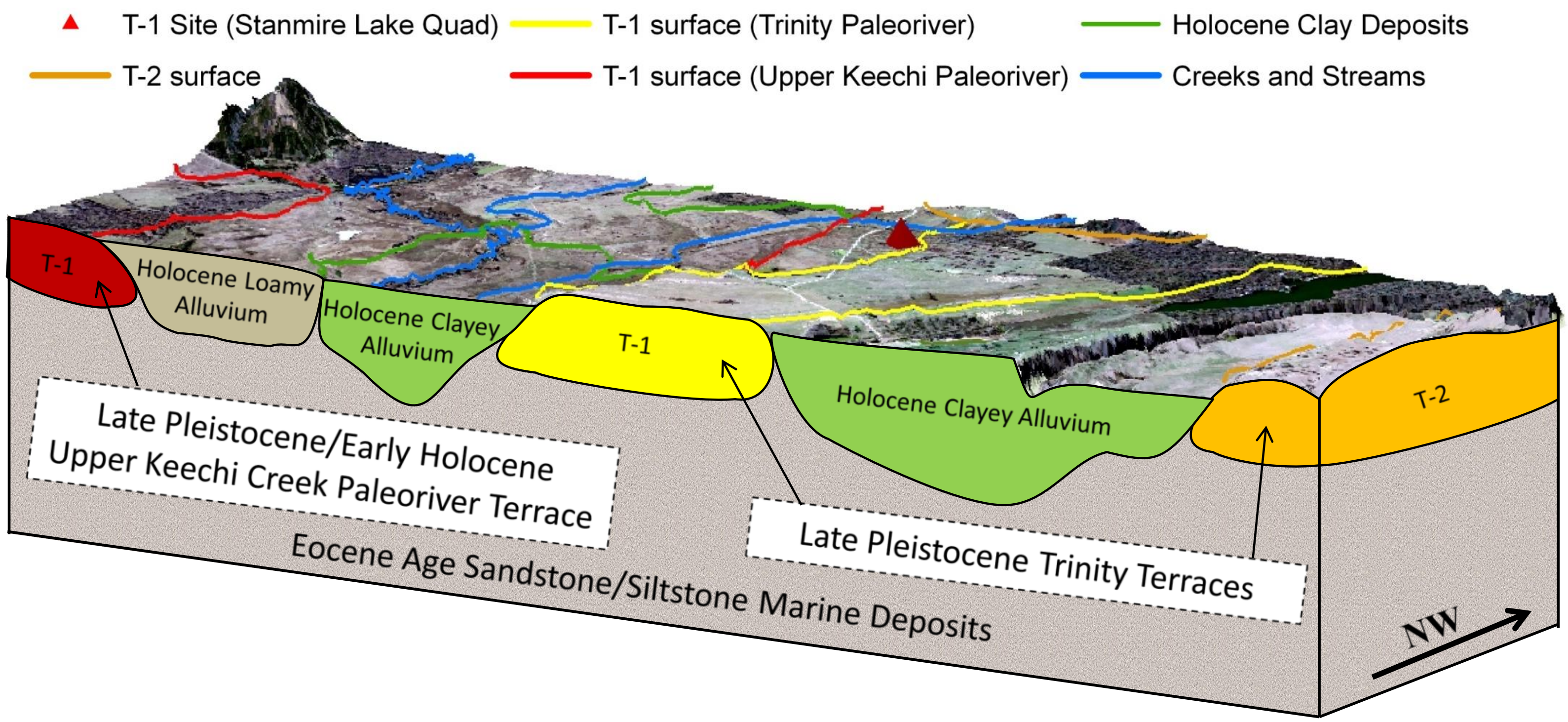


Fig. 10. Block Diagram of T-1 (Stanmire Lake Quad) Site. Sampling site (red triangle) relative to older T-1 surface, younger Upper Keechi T-1 surface, and more recent Holocene deposits. Modern Trinity River represented by Holocene Clayey Alluvium (on right) and modern Upper Keechi Creek represented by left fork of blue line and Holocene Clayey Alluvium to left, while the two blue lines nearest the sampling site represent modern unnamed streams.

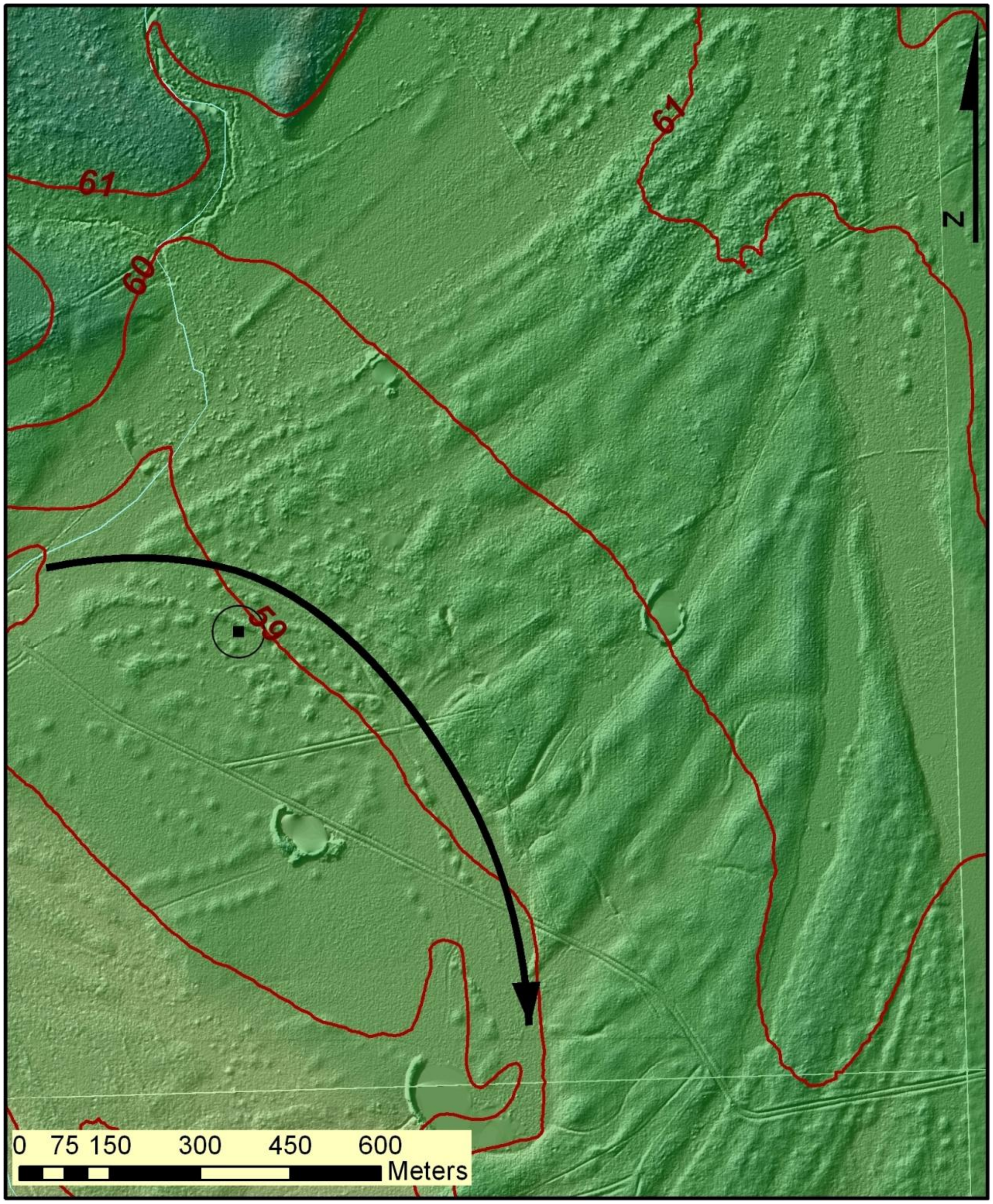


Fig. 11. Shaded relief image of T-1 (Stanmire Lake Quad) Site at 1:12,000 scale. Contour lines (red) and sampling location (point within a circle) illustrate site with respect to surrounding landscape. Contour interval of 1m. Older T-1 surface represented by broad curvilinear ridges and younger Upper Keechi T-1 surface represented by mounded area (elevation 58 to 59.5 m) surrounding the sampling site. The final channel position of the Upper Keechi paleoriver prior to avulsion represented by black line.

The coarser size of sediments at this site (T-1 Stanmire Lake Quad) may be attributed to a confined sediment load of mostly fine sands derived locally from Eocene age deposits of East-Central Texas. While this site is expected to contain some reworked sediments derived from the previous T-1 surface, the predominance of locally derived sediments from the Upper Keechi Creek paleoriver contrasts the finer clay-free sediments observed in the T-1 Middleton Site which received its sediment load almost entirely from deposits stretching from the Central Plains of Texas and through various Coastal Plains sediments along the course of the Trinity River watershed.

While some of the 1-2 m of overbank deposits which drape the zone of lateral accretion may have been deposited prior to the river down cutting into its modern floodplain, the river and Upper Keechi Creek continue to occasionally flood this site and provide additions of fine clay and silt size particles to this system. These ongoing additions coupled with the other processes of pedogenesis provide for a most unique grouping of soils that continue to develop today.

T-1 (Middleton Quad) Site

Table 3 provides selected morphological, physical and chemical characteristics of the soils sampled at the T-1 Middleton Site. Complete morphological descriptions are provided in Appendix A and complete physical and chemical data are provided in Appendix B. Figure 12 shows the orientation of the five sampled pedons with respect to microtopography.

Table 3. Selected morphological, physical, and chemical characteristics of T-1 (Middleton Quad) pimple mound and intermound pedons. †

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
		Aquic Glossudalf: Intermound swale (S11TX2897010)						
Ap	0-14	48.7	38.9	12.4	L	10YR 5/2	1FSBK	5.2
Bt/E	14-32	43.9	33.0	23.1	L	10YR 5/4	2MSBK	5.1
Bt1	32-59	37.6	31.8	30.6	CL	10YR 5/3	2MABK	5.6
Bt2	59-96	38.4	30.9	30.7	CL	10YR 5/3	2MSBK	7.7
Bt3	96-133	59.8	21.4	18.8	VFSL	10YR 5/4	2MSBK	8.1
Bt4	133-162	49.4	24.1	26.5	SCL	10YR 5/6	2MSBK	7.9
Bt5	162-190	40.6	28.9	30.5	CL	10YR 5/6	2MSBK	7.9
Bt6	190-213	49.3	24.6	26.1	SCL	10YR 5/4	1MSBK	8.0
BC	213-236	61.9	20.4	17.7	VFSL	10YR 6/6	1COSBK	8.1
C1	236-263	38.3	32.5	29.2	CL	10YR 5/4	0MA	8.0
C2	263-316	61.7	20.8	17.5	VFSL	10YR 6/6	0SGR & 0MA	8.5
C3	316-336	96.1	1.4	2.5	FS	10YR 7/3	0SGR	8.2
		Haplic Glossudalf: Edge of pimple mound (S11TX2897011)						
Ap	0-18	65.5	29.0	5.5	VFSL	10YR 4/3	1FSBK	5.5
E	18-39	64.4	28.9	6.7	VFSL	7.5YR 5/4	1MSBK	5.0
Bt/E	39-46	46.6	25.5	27.9	SCL	5YR 4/6	2MSBK	5.1
Bt1	46-61	27.7	19.2	53.1	C	2.5YR 4/6	2MABK	4.8
Bt2	61-91	36.0	25.8	38.2	CL	5YR 4/6	2MABK	5.1
Btk1	91-132	52.4	18.3	29.3	SCL	7.5YR 4/6	2MSBK	7.9
Btk2	132-163	64.0	15.7	20.3	SCL	10YR 6/6	2MSBK	8.1
B't1	163-197	61.2	20.1	18.7	VFSL	10YR 6/6	1MSBK	8.1
B't2	197-208	35.1	32.9	32	CL	10YR 5/6	1MSBK	8.0
BCt	208-222	56.8	23.1	20.1	SCL	10YR 6/4	1COSBK	8.2
CBt	222-244	44.2	30.1	25.7	L	10YR 5/6	1COSBK	8.5
C1	244-266	73.4	16.2	10.4	VFSL	10YR 6/3	0MA	8.9
C2	266-312	72.4	17.6	10	VFSL	10YR 7/2	0SGR	9.1
C3	312-330	82.3	11.3	6.4	LFS	10YR 7/3	0SGR	9.1
		Glossic Paleudalf: Summit of pimple mound (S11TX2897012)						
Ap	0-19	65.9	28.9	5.2	VFSL	10YR 4/3	1FSBK	5.6
E1	19-42	66.6	28.1	5.3	VFSL	10YR 4/4	1MSBK	6.0
E2	42-67	67.2	27.3	5.5	VFSL	10YR 5/4	1MSBK	5.9
E3	67-94	65.6	27.0	7.4	VFSL	7.5YR 5/4	1MSBK	4.7
E/Bt	94-113	66.0	25.9	8.1	VFSL	10YR 5/4	2MSBK	4.8
Bt1	113-150	38.8	20.3	40.9	C	10YR 5/4	2MABK	4.7
Bt2	150-190	46.6	21.3	32.1	SCL	5YR 5/6	2MSBK	4.8
Bt3	190-212	58.5	18.7	22.8	SCL	10YR 5/6	2MSBK	6.4
Bt4	212-240	54.9	21.4	23.7	SCL	10YR 5/6	1MSBK	7.5
BCt	240-264	70.1	15.0	14.9	VFSL	10YR 6/6	1COSBK	7.9
CBt	264-295	60.1	21.8	18.1	VFSL	10YR 6/6	1COSBK	8.4
C1	295-319	78.6	11.6	9.8	VFSL	10YR 7/6	0MA	8.6
C2	319-340	80.1	11.7	8.2	LFS	10YR 7/3	0SGR	8.9

Table 3 Continued.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
		Haplic Glossudalf: Edge of pimple mound (S11TX2897013)						
Ap	0-20	65.9	28.3	5.8	VFSL	10YR 4/3	1MSBK	5.0
E1	20-39	66.8	27.1	6.1	VFSL	10YR 5/3	1MSBK	4.9
E2	39-66	58.1	24.1	17.8	VFSL	10YR 5/3	1MSBK	5.2
Bt/E	66-101	44.9	22.8	32.3	CL	10YR 5/4	2MSBK	5.2
Bt	101-128	42.8	23.7	33.5	CL	10YR 5/4	2MABK	5.3
Btss	128-159	41.4	23.4	35.2	CL	10YR 5/4	2MWEG	6.1
Btk1	159-189	38.0	24.2	37.8	CL	10YR 5/6	2MSBK	7.2
Btk2	189-218	56.4	16.1	27.5	SCL	10YR 6/6	2MSBK	7.8
B't	218-242	53.7	21.3	25.0	SCL	10YR 6/6	2MSBK	7.9
BCtk	242-263	67.8	14.2	18.0	VFSL	10YR 6/6	1COSBK	8.5
CB	263-305	79.1	8.4	12.5	VFSL	10YR 7/3	1COSBK	8.5
C1	305-365	80.5	10.4	9.1	LFS	10YR 7/3	0SGR	8.8
C2	365-375	88.3	5.5	6.2	FS	10YR 7/6	0MA	8.6
		Aquic Hapludalf: Intermound swale (S11TX2897014)						
Ap	0-18	42.4	40.0	17.6	L	10YR 5/3	2TKPL / 2MSBK	5.2
Bt	18-32	34.5	34.1	31.4	CL	10YR 5/3	2MSBK	4.8
Btg1	32-53	34.1	29.7	36.2	CL	10YR 5/2	2COABK	4.8
Btg2	53-82	33.5	29.4	37.1	CL	10YR 5/2	2MABK	5.3
Btg3	82-98	33.3	28.1	38.6	CL	10YR 5/2	2MABK	6.8
Btk1	98-119	33.7	26.2	40.1	C	10YR 5/3	2MABK	7.4
Btk2	119-148	34.4	25.3	40.3	C	2.5Y 5/3	1MABK	7.6
Btk3	148-180	45.7	20.4	33.9	SCL	2.5Y 6/3	1MABK	7.8
Btkg	180-206	45.7	23.8	30.5	SCL	10YR 6/2	1COSBK	8.0
B'tg	206-244	51.9	20.2	27.9	SCL	10YR 6/2	1COSBK	8.2
Cg	244-275	73.2	7.9	18.9	FSL	2.5Y 6/2	0MA	8.5
Ck	275-310	81.1	7.8	11.2	FSL	10YR 6/3	0MA	8.6

† Horizon designation and coding according to Schoeneberger et al. (2002).

‡ Soil texture: C, clay; CL, clay loam; FS, fine sand; FSL, fine sandy loam; LFS, loamy fine sand; SCL, sandy clay loam; VFSL, very fine sandy loam.

†† Soil matrix color identified by Munsell ® color notation.

§ Soil structure: Grade - 0 , structureless; 1, weak; 2, moderate; Size - F, fine; M, medium; CO, coarse; TK, thick; Type - ABK, angular blocky; GR, granular; MA, massive; PL, platy; SBK, subangular blocky; SGR, single grain; WEG, wedge; &, and; /, parting to.

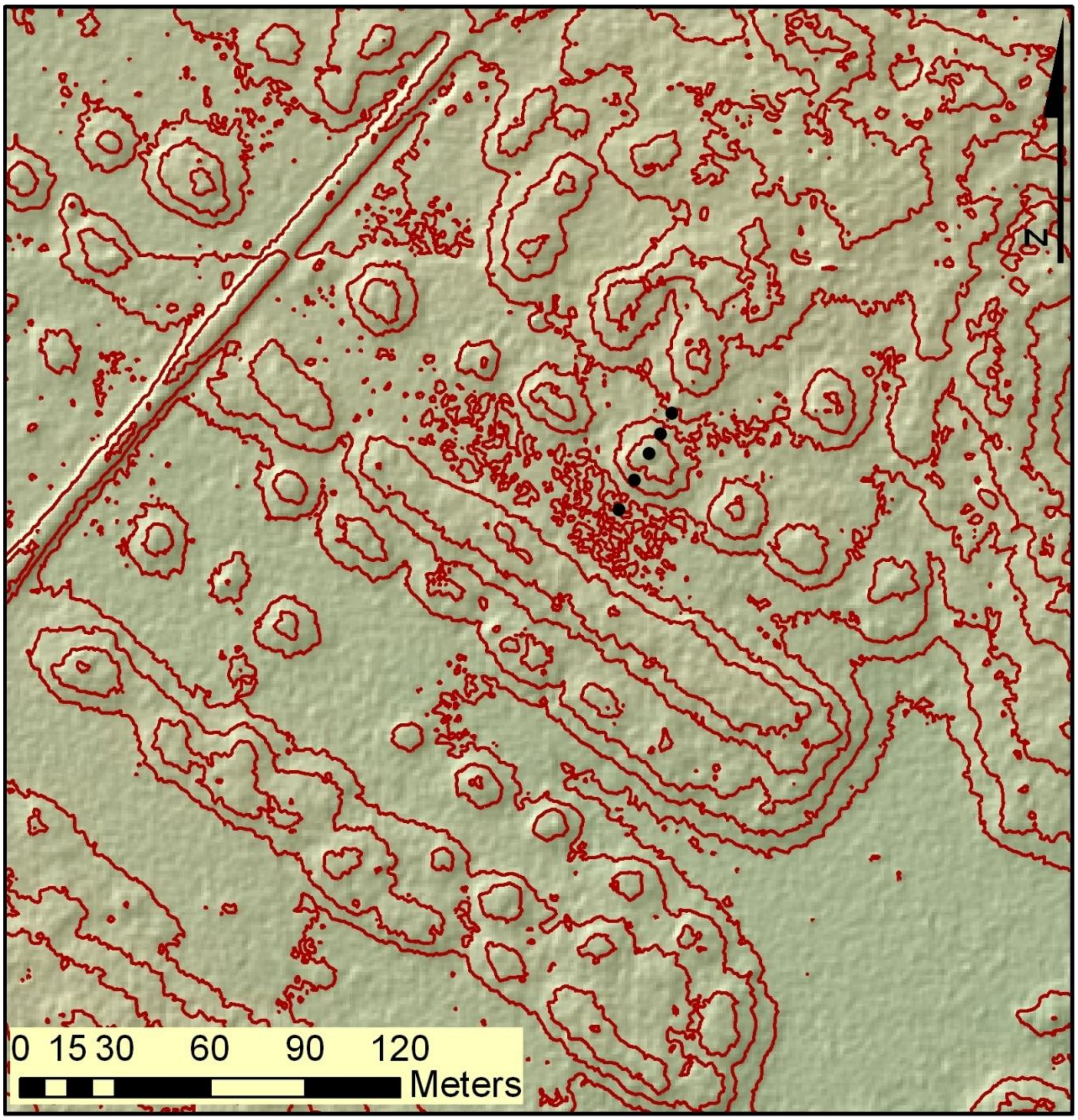


Fig. 12. Shaded relief image of T-1 (Middleton Quad) Site at 1:2,500 scale. Contour lines (red) and locations of the five sampled pedons (black circles) are indicated. Contour interval of 30 cm.

Morphology and Classification of Soils

All sampled pedons at this site (7010-7014) have an ochric epipedon and an argillic horizon with a base saturation estimated from pH to be greater than 35 percent at a depth of 180-200 cm which meets the criteria for Alfisols and a soil moisture regime of udic which meets the criteria for Udalfs. The soil temperature regime for the study site is thermic with a mean annual air temperature of about 18.6° C. The soils of this site are more homogenous in comparison to the other T-1 (Stanmire Lake Quad) Site with three great group classifications identified among the five sampled pedons within a linear distance of 35 m. Great groups identified include Glossudalfs, Hapludalfs, and Paleudalfs.

The intermound swale pedon 7010 has an ochric epipedon to a depth of 14 cm, a glossic horizon from 14-32 cm, an argillic horizon from 14-213 cm, skeletans from 32-133 cm, and redoximorphic features throughout. The glossic horizon and skeletans indicate that clay is eluviating from the upper portion of the argillic horizon and possibly accumulating within the Bt5 horizon. Soil structure is subangular blocky except for angular blocky in the upper portion of the solum from a depth of 32-59 cm. The underlying material is stratified structureless massive clay loam from a depth of 236-263 cm, stratified structureless single grain very fine sandy loam to a depth of 316 cm, and to the depth of sampling at 336 cm is structureless single grain fine sand. The presence of redox depletions within 25 cm of the upper boundary of the argillic horizon, aquic conditions in normal years, and a glossic horizon meets the criteria for Aquic Glossudalfs. The particle-size control section from 14-64 cm averages 27.9 percent clay content and more than 15 percent of the particles are fine sand or coarser, so the particle-size class is fine-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils that contain a higher clay content. Therefore, the soil is classified as a fine-loamy, siliceous, active, thermic Aquic Glossudalf and is similar to the Sawtown soil series which is typically found on nearly level or very gently sloping Pleistocene-age stream terraces in eastern Texas. The typical pedon for Sawtown is found near Brachfield in Rusk County, Texas.

The pimple mound edge pedon (7011) has an ochric epipedon to a depth of 39 cm, a glossic horizon from 39-46 cm, an argillic horizon from 39-244 cm, pressure faces on the horizontal faces of peds from 46-91 cm, redoximorphic features throughout the profile below a depth of 46 cm, and secondary carbonates from 91-163 cm. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the Btk1 horizon at a depth of 91 cm. The underlying material is stuctureless massive very fine sandy loam from a depth of 244-266 cm, stratified structureless single grain very fine sandy loam to a depth of 312 cm, and to the depth of sampling at 330 cm is structureless single grain loamy fine sand. The presence of a glossic horizon less than 50 cm in thickness meets the criteria for Haplic Glossudalfs. The particle-size control section from 39-89 cm averages 41.2 percent clay content so the particle-size class is fine. Mineralogy was not determined for this soil.

However, morphological characteristics suggest smectitic mineralogy. Therefore, the soil is classified as a fine, smectitic, thermic Haplic Glossudalf and is not similar to any established soil series.

The pimple mound summit pedon (7012) has an ochric epipedon to a depth of 94 cm, a glossic horizon from 94-113 cm, an argillic horizon from 113-295 cm, and redoximorphic features throughout the profile below a depth of 67 cm. Soil structure changes from subangular to angular blocky in the upper argillic horizon before returning to subangular blocky in the Bt2 horizon at a depth of 150 cm. The underlying C material is stratified stuctureless massive very fine sandy loam from a depth of 295-319 cm, and to the depth of sampling at 340 cm is stratified structureless single grain loamy fine sand. The presence of a yellowish red (5YR 5/6) matrix color, and a glossic horizon, together with an increase in clay content with depth within the upper 150 cm of the mineral soil surface met the criteria for Glossic Paleudalfs. The particle-size control section from 25-100 cm averages 9.5 percent clay content by weight so the particle-size class is coarse-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is likely active or superactive given the indications of smectitic mineralogy in surrounding soils. Therefore, the soil was classified as a coarse-loamy, siliceous, active, thermic Glossic Paleudalf and is similar to the Gallime soil series which is typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

The pimple mound edge pedon 7013 has an ochric epipedon to a depth of 66 cm, a glossic horizon from 66-101 cm, an argillic horizon from 66-263 cm, redoximorphic features throughout the profile, pedogenic slickensides from 128-159 cm, and secondary carbonates from 159-218 cm. Soil structure changes from subangular to angular blocky to wedge in the argillic horizon before returning to subangular blocky in the Btk1 horizon at a depth of 159 cm. The underlying C material is stuctureless single grain loamy fine sand from a depth of 305-365 cm, and stratified structureless massive fine sand to the depth of sampling at 375 cm. The presence of a glossic horizon less than 50 cm in thickness meets the criteria for Haplic Glossudalfs. Although vertic features are present in this soil, they are not present within 100 cm of the surface so this soil did not meet the criteria for a vertic subgroup. The particle-size control section from 66-116 cm averages 32.7 percent clay content, therefore the particle-size class is fine-loamy. Mineralogy class and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous, and the cation-exchange activity class is likely active or superactive given the morphological indications of smectitic clay mineralogy in this soil. The soil is classified as a fine-loamy, siliceous, superactive, thermic Haplic Glossudalf and is not similar to an established soil series.

The intermound swale pedon (7014) has an ochric epipedon to a depth of 18 cm, an argillic horizon from 18-244 cm, secondary carbonates from 98-206 cm, and redoximorphic features throughout the pedon. Soil structure of the surface is platy possibly from disturbance by livestock, then changes to subangular blocky and angular blocky in the upper argillic horizon before returning to subangular blocky in the Btkg horizon at a depth of 180 cm. The underlying sediments are stratified stuctureless massive fine sandy loam from a depth of 244 cm to the depth of sampling at 310 cm. The presence of redoximorphic depletions within 25 cm of the upper boundary of the argillic horizon and aquic conditions in normal years meets the criteria for Aquic Hapludalfs. The particle-size control section from 18-68 cm averages 35.1 percent clay content, so the particle-size class is fine. Mineralogy was not determined for this soil, but morphological characteristics suggest smectitic mineralogy. The soil is classified as a fine, smectitic, thermic Aquic Hapludalf and is similar to the Yeaton soil series which is typically found on Pleistocene-age marine terraces of the Gulf Coast Prairie in Southeast Texas. The typical pedon for Yeaton is found near Dayton in Liberty County, Texas.

Endosaturation and Episaturation

Figure 13 details the sampled soil pedons of the T-1 (Middleton Quad) Site relative to elevation with special emphasis given to reduced matrix colors or gleyed horizons. One intermound pedon (7014) exhibited gleyed horizons (soil matrix colors of chroma 2 or less) indicative of saturation in normal years within 50 cm of the soil surface, but these reduced colors are present in the upper portion of the argillic horizon beginning below the Bt horizon in the Btg1 horizon at a depth of 32 cm. Other sampled pedons at this site exhibit characteristics indicative of saturation within 100 cm in normal years, however stronger indications were observed below that depth. Indicators

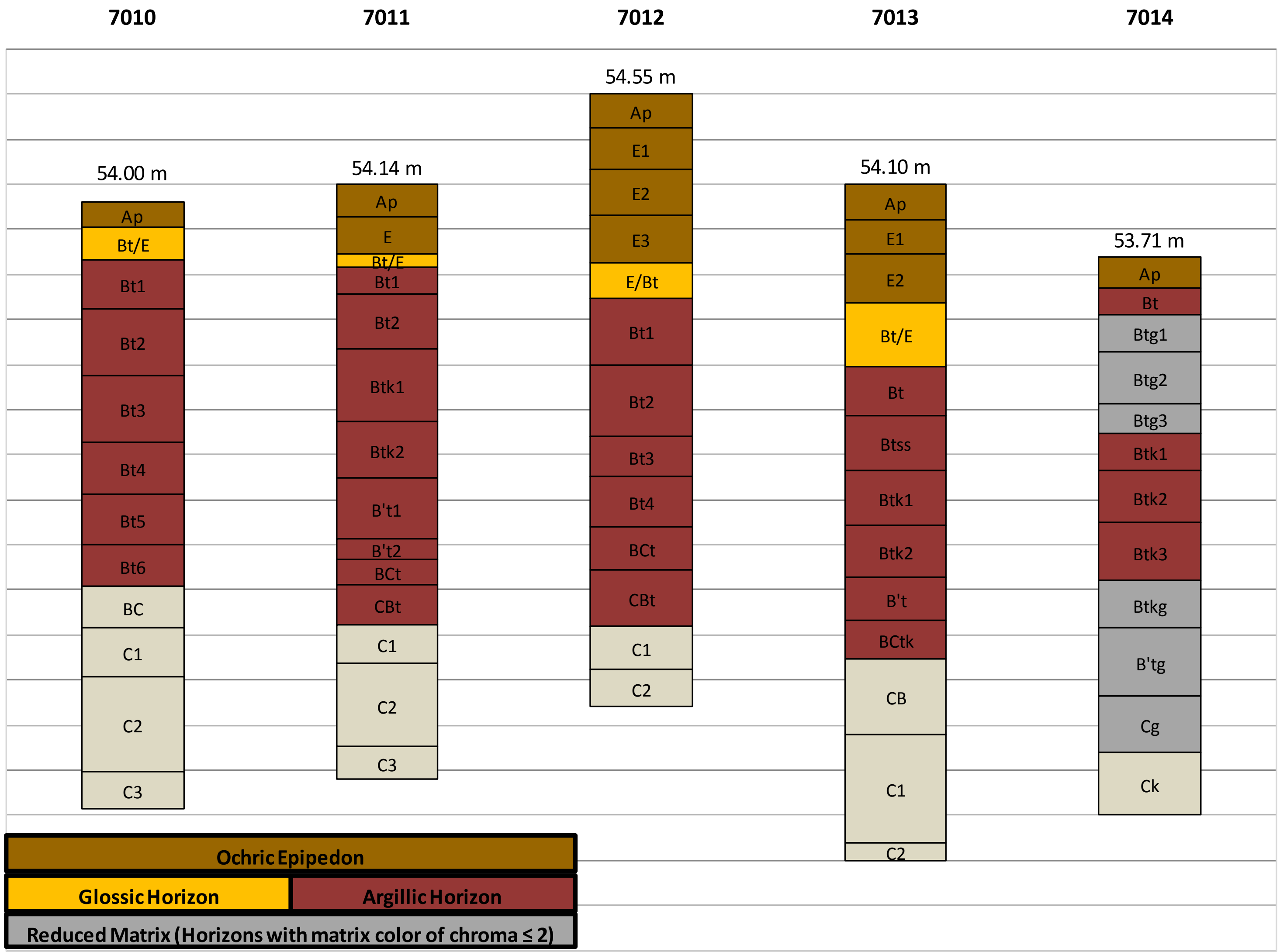


Fig. 13. Observed soil horizons by pedon relative to elevation at T-1 (Middleton Quad) Site. Vertical axis interval is 25 cm.

which may be attributed to water saturation include glossic horizons, accumulations of secondary carbonates, and alkaline pH values. The presence of glossic horizons in four of the five sampled pedons indicates that argillic horizons are being degraded by water movement. This may also indicate that the perching of water followed by drying of the soil may result in ferrolysis in many of these soils. In each glossic horizon, pH values are sufficiently low (< 5.5) to support ferrolysis.

A normal percolative moisture regime might be expected at this site given the humid climate together with a slope of one percent across the study site, but what is observed is a situation where the moisture regime varies seasonally, amphipercolative (Yaalon, 1983). At the time of sampling an extreme example of this seasonal fluctuation was observed. During normal years these fluctuations may regularly occur although not as drastic. This allows for periods in which precipitation exceeds evaporation and leads to ponding of water in lower topographic positions, and a general downward movement of water. This is followed by periods in which evaporation exceeds precipitation and upward movement of water occurs at the capillary fringe.

A discussion of upward water movement in these soils should begin with a discussion of the underlying occluded aquifer. Although a water table was not present at the time of sampling due to the extreme drought conditions, the stratified bedding planes of finer sediments underlying this site should provide sufficient impediment to downward water movement in most years for a groundwater table to exist below a depth of 2 to 4 m. These waters seem to be high in soluble sodium and saturated with respect to calcite. The pH values of sodic soils generally exceed 8.5 and may be as great as 10 in some soils (Brady and Weil, 2008), and values at the study site are within that range below a depth of 2.5 m. Secondary carbonates are also prevalent in horizons below a depth of 100 cm.

Secondary carbonates are attributed to upward movement of calcite-saturated waters. During periods of high precipitation, leaching supersedes evaporation in the mounds and water is ponded in the lower intermounds (i.e. the Btkg horizon of pedon 7014). However, during periods when evaporation exceeds precipitation, the capillary fringe of the groundwater table preferentially moves upward to the higher clay content and microtopography of the pimple mound edges. This action may also be attributed to the impediment of downward water movement by an aquitard created by the concentration of clay in the upper horizons of the argillic horizon across the mound pedons (7011-7013). This might cause greater subsurface flow along the contact with the upper argillic horizon directing water to the intermounds and away from the areas of carbonate accumulation in the edges of mounds. The carbonates of the lower intermound (7014) may be associated with the capillary fringe of an occluded aquifer despite its position in a water receiving location.

Although gleyed soil horizons are only present in the lower horizons of the lowest intermound pedon (7014), other indications of endosaturation were observed in all pedons. The most obvious indications were alkaline pH values attributed to high sodium groundwater. Indications of the perching of water in the upper portion of pedons may be indicated by glossic horizons and redoximorphic features overlying a sharp clay increase or abrupt textural change.

The presence of a glossic horizon, light brownish gray (10YR 6/2) iron depletions, and the presence of skeletans on the vertical faces of peds in pedon 7010 is indicative of the perching of water at a depth of 14-32 cm. While an increase in pH from 5.6 to 7.7 in the Bt2 horizon may indicate the presence of fluctuating water tables at a depth of 59 cm; the pH value of 8.5 in the C2 horizon is attributed solely to endosaturation at a depth of 263 cm.

The presence of a glossic horizon and a 25.3 percent increase in clay in the Bt1 horizon is indicative of the perching of water in pedon 7011 at a depth of 46 cm. An increase in pH from 5.1 to 7.9 in the Btk1 horizon together with the presence of secondary carbonates may indicate endosaturation to a depth of 91 cm or may indicate that the leaching of carbonates does not occur due to an overlying aquitard attributed to the Bt1 horizon and a clay content of 53.1 percent. The pH of 8.5 in the CBt horizon at a depth of 222 cm, is attributed solely to groundwater as are pH values in underlying C horizons of 8.9, 9.1, and 9.1 respectively.

The presence of a glossic horizon in pedon 7012 suggests episaturation, and the 32.8% increase in clay content at 113 cm together with the presence of many grayish brown (10YR 5/2) iron depletions in the Bt1 horizon is evidence that water perches at this depth today. An increase in pH to 8.4 in the CBt horizon (264-295 cm) is attributed to saturation by groundwater, and the high pH values in horizons deeper than 295 cm suggest a Na-rich groundwater.

The presence of a glossic horizon in pedon 7013 suggests episaturation, and the clay increase of 14.5% at a depth of 66 cm is further evidence that water perches within the Bt/E horizon. An increase to pH 7.2 in the Btk1 horizon at a depth of 159 cm together with the presence of secondary carbonates may indicate endosaturation at that depth and below, but may also result from the presence of an aquitard as described in pedon 7011 attributed to the overlying Btss horizon. A pH value of 8.5 in the BCtk horizon together with secondary carbonates at this depth suggests that groundwater fluctuations may be to a depth of 242 cm.

Gleyed horizons from 32-98 cm in pedon 7014 may indicate that episaturation occurs periodically. An increase in pH from 6.8 to 7.4 together with the presence of secondary carbonates indicates that groundwater fluctuations occur within 98 cm of the surface in this pedon. A pH value of 8.5 in the Cg horizon at a depth of 244 cm is attributed to fluctuating Na-rich groundwater.

Depositional Environment

The homogeneity of the soils of the T-1 (Middleton Quad) Site is attributed to the fluvial depositional environment of the past. At the time of deposition the paleoriver may have followed a general path illustrated by the black line in Fig. 14. The possible river path is visualized by the general trend of the arcuate rows of mounds and curvilinear ridges across the expanse of the T-1 level at this site. The proposed movement of the river relative to its meander at the point of sampling is in a southwestern direction with point bar deposits being laid down from northeast to southwest.

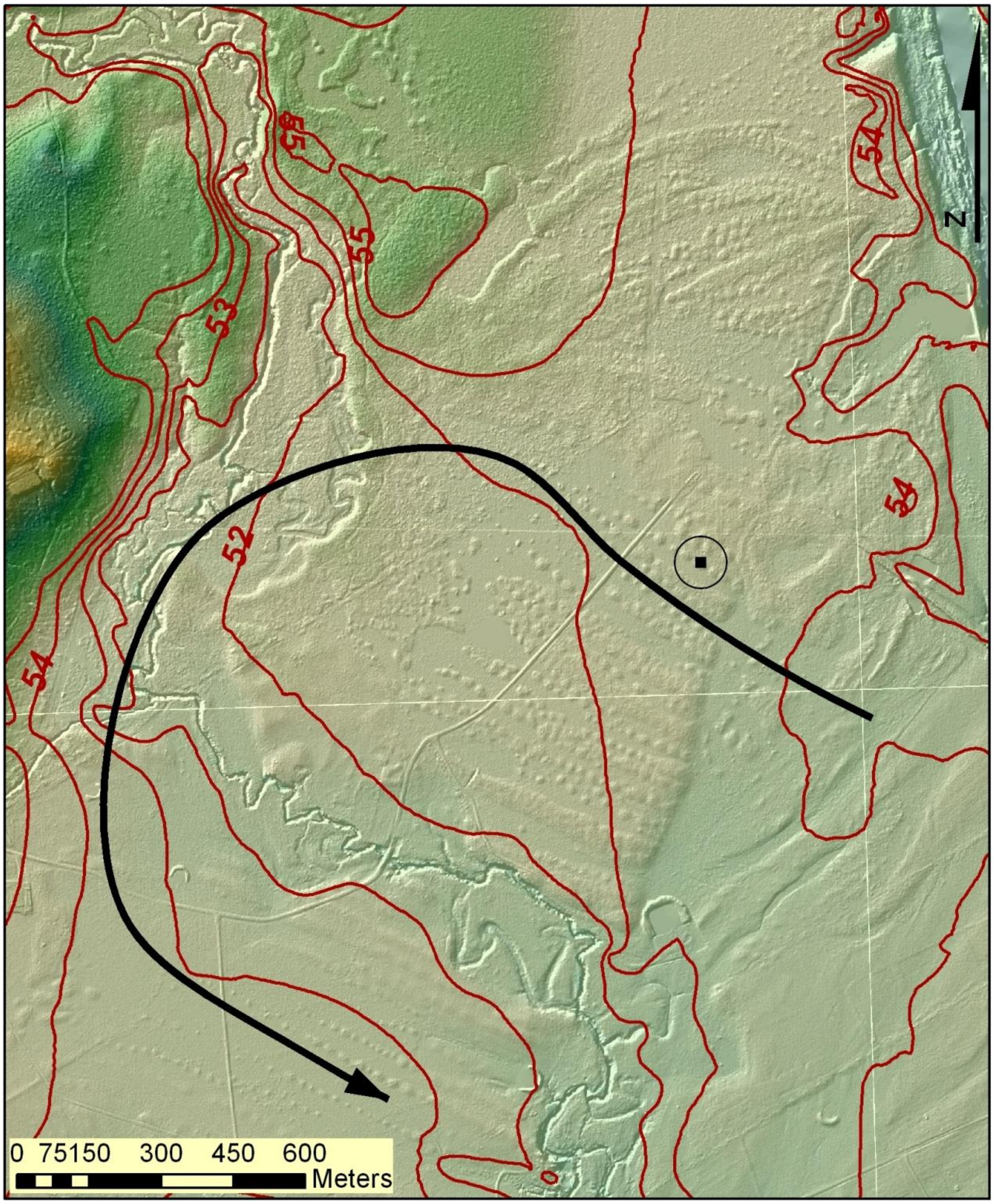


Fig. 14. Shaded relief image of T-1 (Middleton Quad) Site at 1:15,000 scale. Contour lines (red) and sampling location (point within a circle) illustrate site with respect to surrounding landscape. Contour interval of 1m. Black line indicates the general trend of the meandering paleoriver at the time of deposition.

The sampling site therefore is situated in a position in which sediments were deposited over a prolonged period of time as the river moved across its flood plain to the southwest. This allowed for deposition of overbank deposits enriched in very fine sands and silts during the period of deposition at this level with flood events at times depositing in alternating periods of finer and then coarser sediments as illustrated in Fig. 15. Expressed on a clay-free basis, the base sediments had a mean particle size of about 100 µm or coarser in all pedons, with fining upward to a mean particle size of less than75 µm. The intermound swales showed the finest mean particle size of < 50 µm. The degree of sorting of sediments based on the standard deviation of the clay-free particle sizes (Fig. 16), trends toward moderate sorting at the deeper samplings. These lower standard deviations are associated with the lateral accretion deposits.

While a fining upward trend was observed in the five sampled pedons, pedons 7010 and 7011 exhibit erratic depositional events from 50-200 cm (Fig. 15). This may be explained by analysis with respect to the possible addition of erosional sediments from the adjacent row of mounds north of this intermound and mound edge seen in Fig. 12. By comparison the intermound pedon 7014 sampled from near the center of a wide swale has not received sediments from adjacent mounds and ridges. From about 0 to75 cm in the pimple mound edge pedons, a coarsening trend may be explained as erosion by wind, water, or biotic activity in which sediments from the mound summit have been deposited on the mound edges. While some erosional sediment is deposited in the intermounds, these additions in large part have been masked by the overriding addition of clays and silts from flooding. This explains the uniform fining upward sequence

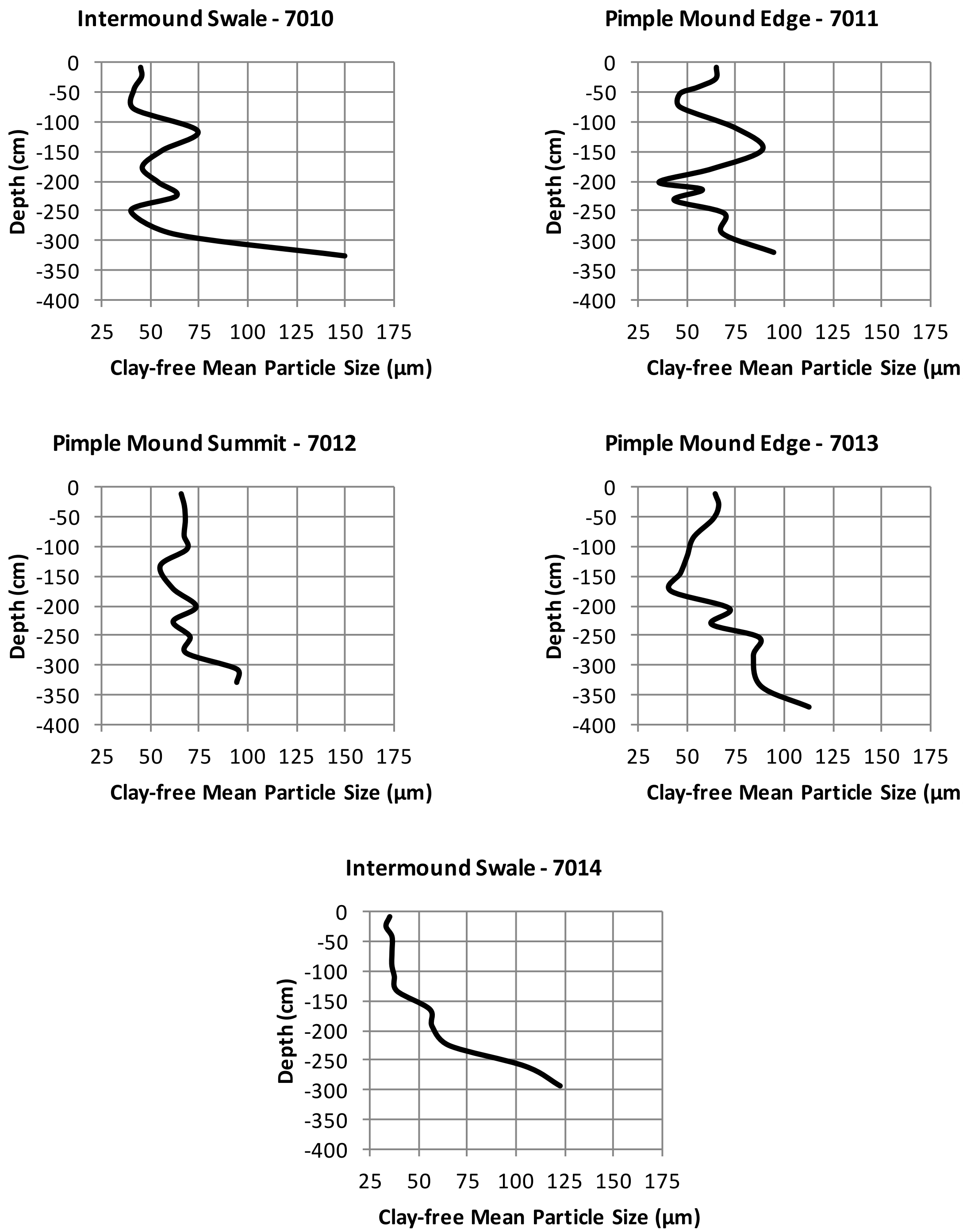


Fig. 15. Clay-free mean particle size (2-2000 µm fraction) with depth for the study soils at the T-1 (Middleton Quad) Site. Pedons identified in relation to pimple mound and intermound positions.

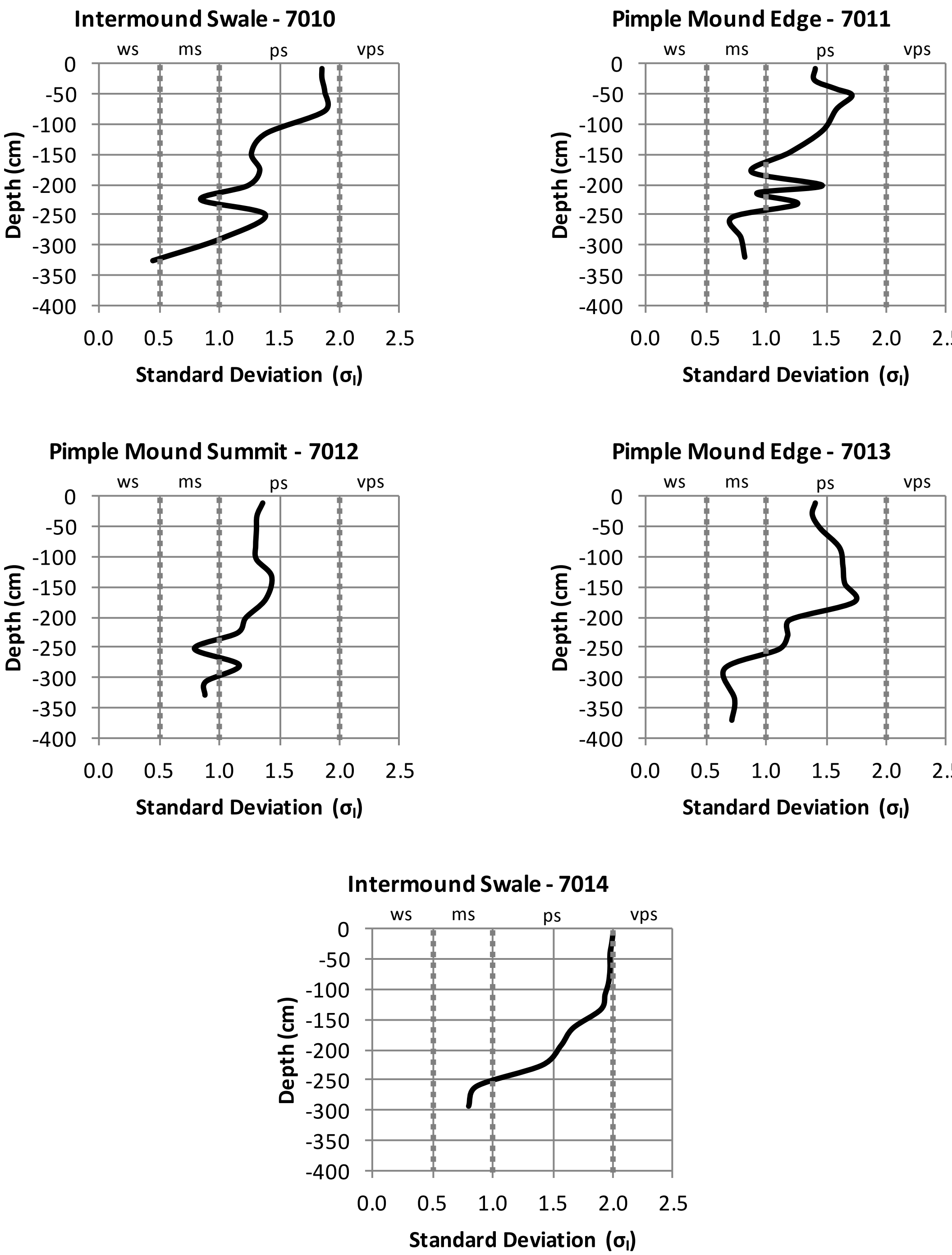


Fig. 16. Clay-free standard deviation of particle size distribution with depth for the study soils at the T-1 (Middleton Quad) Site. Letters along the top margin give verbal limits for standard deviation: ws, well sorted; ms, moderately sorted; ps, poorly sorted; vps, very poorly sorted. Pedons are identified in relation to pimple mound, and intermound positions.

found in the summit, and lower intermound which contrasts with the fluctuations observed in pedons 7010, 7011, and 7013.

Zone of Lateral Accretion

Further evidence for a fluvial origin is observed when the soil surface is compared to the top of materials deposited by lateral accretion (Fig. 17). This relationship provides further evidence that the pimple mounds at this site are residual components of accretion ridges on point bar deposits associated with the meandering paleoriver as is illustrated by the curvilinear rows of mounds and ridges in Fig. 14. While clay and silt size particles were deposited during the stage of a lateral accretion depositional environment, most of the fine particles in this system were deposited during the river's slow retreat to the southwest and during major flood events today (vertical accretion). Further illustration of the landscape position of the T-1 and several other terrace surfaces in relation to the modern Trinity River is provided in Fig. 18.

The dynamic nature of rivers and fluvial environments makes determining the depth at which vertical accretion began and lateral accretion ended a difficult task. The determination considered the clay-free mean particle size, total sand content, and degree of sorting. The degree of sorting quantified by standard deviation of clay-free sediments was given the greatest weight.

The sediments of the zone of lateral accretion were deposited in a higher velocity depositional environment than the overbank deposits in the zone of vertical accretion, thus the sediments of lateral accretion would be coarser than those of vertical accretion.

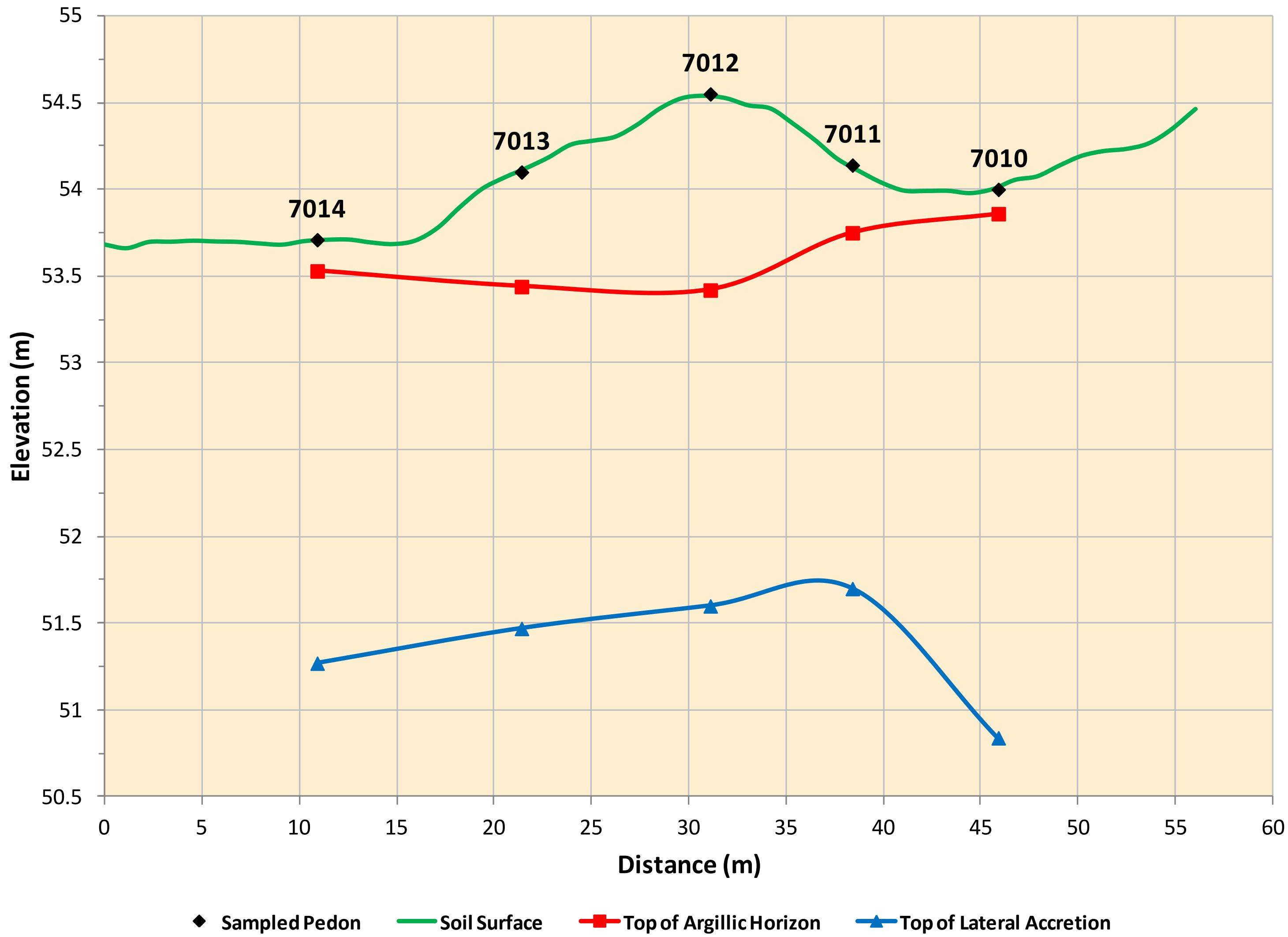


Fig. 17. Relation of lateral accretion to modern topography at T-1 (Middleton Quad) Site.

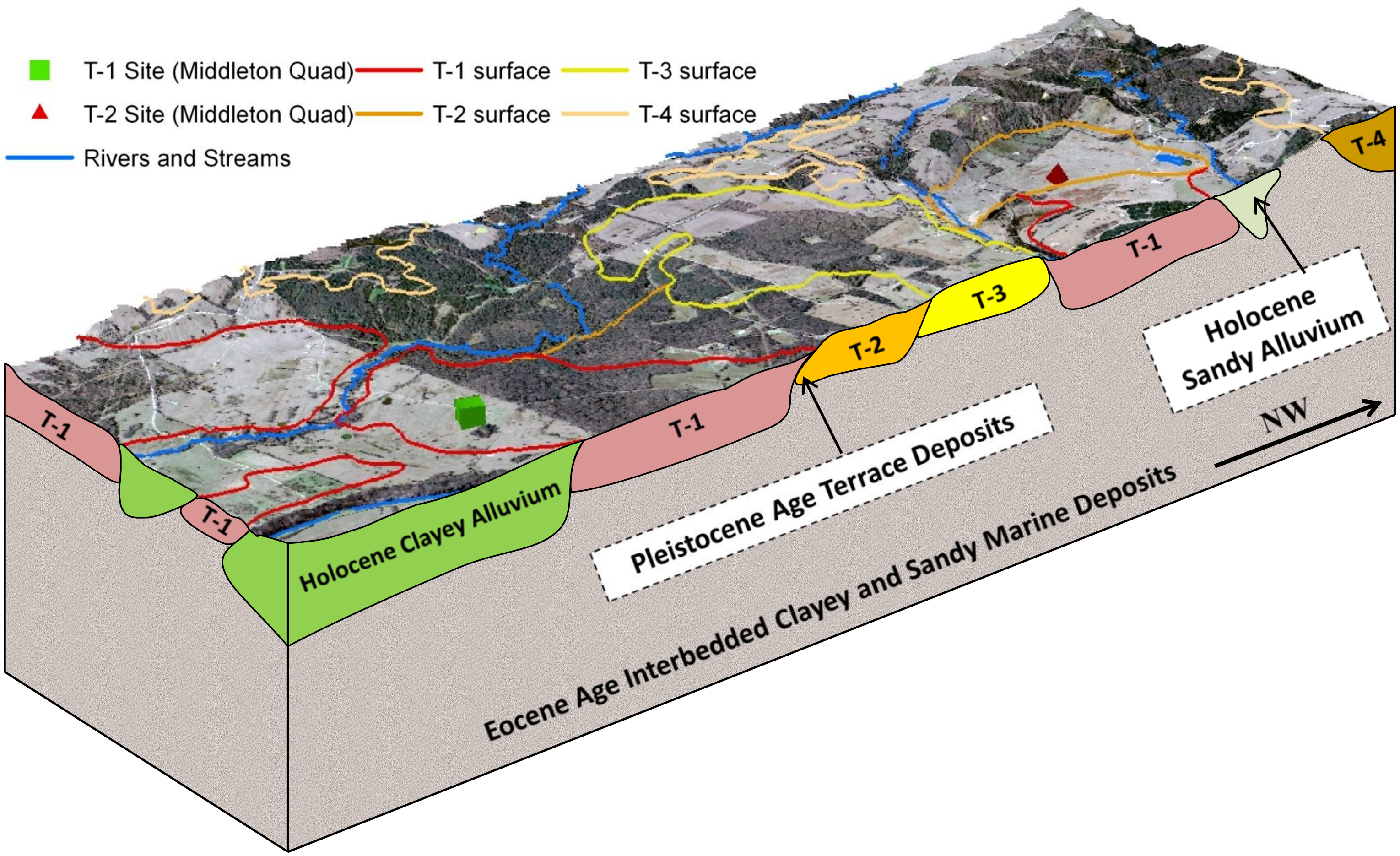


Fig. 18. Block diagram of the T-1 and T-2 Sites (Middleton Quad) relative to surrounding deposits of various age. Trinity River is represented by the Holocene clayey alluvium in the foreground. T-5 surfaces occur in isolated areas between the T-4 surfaces and residuum and are not delineated. These higher terraces exhibit a limited extent of pimple mounds on sloping surfaces.

At this site poorly sorted sediments with a standard deviation greater than 1.0 are attributed to the zone of vertical accretion, while moderately and well sorted sediments with a standard deviation of less than 1.0 are assigned to the zone of lateral accretion.

The zone of lateral accretion in pedon 7010 begins at a depth of 316 cm and the top of the C3 horizon. Indications supporting this conclusion include an increase in total sand from 61.7 to 96.1 percent, a coarsening of the clay-free mean particle size from 68.3 to 94.3 µm, and a transition from poorly sorted sediments (standard deviation of 1.0) to well sorted sediments (standard deviation of 0.4).

Lateral accretion in pedon 7011 begins at a depth of 244 cm and the top of the C1 horizon. Data supporting this conclusion include an increase in total sand from 44.2 to 73.4 percent, a coarsening of the clay-free mean particle size from 43.7 to 69.1 µm, and a transition from poorly sorted sediments (standard deviation of 1.3) to moderately sorted sediments (standard deviation of 0.7).

The lateral accretion in pedon 7012 begins at a depth of 295 cm and the top of the C1 horizon. This depth is supported by an increase in total sand from 60.1 to 78.6 percent, a coarsening of the clay-free mean particle size from 68.2 to 94.3 µm, and a transition from poorly sorted sediments (standard deviation of 1.2) to moderately sorted sediments (standard deviation of 0.9).

Lateral accretion in pedon 7013 begins at a depth of 263 cm and the top of the CB horizon. Data supporting this depth include an increase in total sand from 67.8 to 79.1 percent, and a transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.7). The clay-free mean particle size was not used as an indicator in this pedon with deference given to the degree of sorting or standard deviation as it appears that the BCtk horizon, with a clay-free mean particle size of 87.2 µm is transitional to the zone of lateral accretion in the CB horizon, with a clay-free mean particle size of 84.2 µm.

The zone of lateral accretion in pedon 7014 begins at a depth of 244 cm and the top of the Cg horizon. This is supported by an increase in total sand from 51.9 to 73.2 percent, a coarsening of the clay-free mean particle size from 65.8 to 105 µm, and a transition from poorly sorted sediments (standard deviation of 1.4) to moderately sorted sediments (standard deviation of 0.9).

T-2 (Middleton Quad) Site

Table 4 and 5 provide selected morphological, physical and chemical characteristics of the soils sampled at the T-2 Middleton Site. Complete morphological descriptions are provided in Appendix A; complete physical and chemical data are given in Appendix B.

Morphology and Classification of Soils

All sampled pedons at this site (Pedons 2, 3, 4, 7021 and 7023) have an ochric epipedon and an argillic horizon with a base saturation greater than 35 percent at the shallowest depth either 125 cm below the upper boundary of the argillic horizon or 180 cm below the soil surface which meets the criteria for Alfisols. Three of the five sampled pedons (2, 3, and 4) were analyzed with respect to base saturation. The

Table 4. Selected morphological, physical, and chemical characteristics of T-2 pimple mound and intermound pedons. †

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure ‡‡	pH (H_2O)	Organic C	CEC/Clay §	Base sat. sum ☼	COLE ▲
	cm	------------%------------				(moist)		1:1	%	ratio	%	cm/cm
						Aquertic Glossudalf: Intermound swale (Pedon 2)						
Ap	0-12	59.9	26.3	13.8	FSL	10YR 4/3	1FGR & 2FSBK	5.6	1.37	0.78	64	0.033
A	12-31	60.8	25.9	13.3	FSL	10YR 4/2	1COSBK	6.2	0.58	0.62	74	0.024
AB	31-42	58.1	24.7	17.2	FSL	10YR 4/2	1COSBK / 2MSBK	5.9	0.4	0.53	70	0.025
Bt/E	42-61	48.0	23.0	29.0	SCL	10YR 5/3	3MABK	5.1	0.37	0.51	68	0.051
Btss	61-83	41.5	22.9	35.6	CL	10YR 5/6	2MWEG	5.0	0.32	0.53	67	0.072
Btssg1	83-102	44.1	23.5	32.4	CL	10YR 5/2	2MWEG	5.1	0.27	0.52	72	0.057
Btssg2	102-133	45.9	21.9	32.2	SCL	10YR 5/2	2MWEG	5.2	0.19	0.53	73	0.060
Bt	133-168	53.9	18.6	27.5	SCL	VA	1COPR / 2MABK	5.4	0.13	0.56	83	0.062
Btg1	168-188	62.2	15.1	22.7	SCL	10YR 6/2	1COPR / 2MABK	5.7	0.13	0.58	87	0.042
Btg2	188-210	73.4	10.7	15.9	FSL	10YR 6/2	1MSBK	6.0	0.09	0.58	78	0.038
Btg3	210-230	66.4	13.9	19.7	FSL	10YR 6/2	1COSBK	5.9	0.09	0.58	84	0.039
BC	230-251	69.7	16.4	13.9	FSL	10YR 5/8	1COSBK	5.9	0.07	0.58	89	--
CB	251-289	64.1	15.8	20.1	SCL	10YR 5/6	1COSBK	5.9	0.08	0.58	80	--
Cg	289-314	77.8	10.3	11.9	FSL	10BG 6/1	0SGR	5.7	0.09	0.56	85	--
C	314-348	91.8	2.8	5.4	FS	7.5YR 6/6	0SGR	6.0	0.07	0.59	78	--
						Glossic Hapludalf: Summit of pimple mound (Pedon 3)						
Ap	0-16	73.8	21.5	4.7	FSL	10YR 4/3	1FSBK	5.4	0.66	0.85	48	0.004
A	16-31	74.3	21.0	4.7	FSL	10YR 4/3	1MSBK	5.7	0.27	0.55	54	0.004
E1	31-59	74.1	21.2	4.7	FSL	10YR 5/4	1MSBK	5.7	0.15	0.43	50	0.011
E2	59-79	72.6	22.3	5.1	FSL	10YR 6/4	1MSBK	5.8	0.12	0.39	60	0.005
Bt1	79-92	62.4	21.1	16.5	FSL	10YR 5/4	2MABK	6.1	0.18	0.37	77	0.021
Bt2	92-114	45.9	14.3	39.8	SC	10YR 5/2	2MABK	5.0	0.3	0.43	75	0.052
Bt3	114-134	52.4	13.0	34.6	SCL	10YR 5/6	2MABK	4.8	0.22	0.45	58	0.031
Bt4	134-161	60.6	11.1	28.3	SCL	10YR 5/6	2MSBK	4.7	0.17	0.46	59	0.024
Bt5	161-187	67.9	9.0	23.1	SCL	7.5YR 5/4	1MSBK	4.7	0.16	0.48	49	0.031
BCtg	187-220	83.1	5.0	11.9	LFS	VA	1COSBK	4.8	0.1	0.50	57	0.027
C1	220-246	88.3	4.8	6.9	LFS	10YR 7/3	0SGR	5.0	0.08	0.54	70	0.013
C2	246-285	79.4	8.0	12.6	FSL	10YR 6/6	0MA	4.7	0.11	0.51	72	--
C3	285-320	81.2	6.1	12.7	FSL	10YR 6/6	0MA	4.7	0.1	0.53	76	--

Table 4 Continued.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure ‡‡	pH (H_2O)	Organic C	CEC/Clay §	Base sat. sum ☼	COLE ▲
	cm	------------	%	------------		(moist)		1:1	%	ratio	%	cm/cm
						Chromic Vertic Endoaqualf: Intermound swale (Pedon 4)						
Ap	0-13	44.3	27.5	28.2	CL	10YR 4/2	1FGR & 1COSBK	5.1	1.81	0.68	68	0.064
Btg1	13-27	43.5	25.9	30.6	CL	10YR 4/2	2MSBK	4.9	0.73	0.59	67	0.057
Btg2	27-41	38.0	22.3	39.7	CL	10YR 4/2	2MABK	4.7	0.53	0.68	57	0.100
Btssg1	41-54	36.0	22.3	41.7	C	10YR 4/2	2MWEG	4.7	0.41	0.68	55	0.101
Btssg2	54-83	35.7	23.2	41.1	C	10YR 4/2	2MWEG	4.8	0.38	0.69	59	0.117
Btssg3	83-123	35.8	25.0	39.2	CL	10YR 5/2	2MWEG	4.7	0.33	0.68	75	0.130
Btssg4	123-165	33.4	26.7	39.9	CL	10YR 4/1	2MWEG	5.5	0.26	0.69	81	0.121
Btyg1	165-190	39.1	23.0	37.9	CL	N 4/	1COSBK	5.3	0.19	0.69	100	0.101
Btyg2	190-205	57.0	14.7	28.3	SCL	10Y 7/1	1COSBK	5.5	0.12	0.61	99	--
B'tg	205-233	60.6	13.4	26.0	SCL	2.5Y 7/1	1COSBK	5.8	0.15	0.62	90	--
BCtg	233-257	66.5	12.3	21.2	SCL	10BG 7/1	1COSBK	6.3	0.23	0.64	90	--
CBtg	257-284	76.9	8.6	14.5	FSL	5BG 6/1	1COSBK	6.5	0.09	0.59	86	--
Cg1	284-308	62.6	17.9	19.5	VFSL	5BG 6/1	0MA	7.1	0.11	0.62	100	--
Cg2	308-337	60.6	21.7	17.7	VFSL	10 BG 6/1	OMA	7.1	0.08	0.65	96	--

† Horizon designation and coding according to Schoeneberger et al. (2002).

‡ Soil texture: C, clay; CL, clay loam; FS, fine sand; FSL, fine sandy loam; LFS, loamy fine sand; SC, sandy clay; SCL, sandy clay loam; VFSL, very fine sandy loam.

†† Soil matrix color identified by Munsell ® color notation; VA, variegated.

‡‡ Soil structure: Grade - 0 , structureless; 1, weak; 2, moderate; 3, strong; Size - F, fine; M, medium; CO, coarse; Type - ABK, angular blocky; GR, granular; MA, massive; SBK, subangular blocky; SGR, single grain; WEG, wedge; &, and; /, parting to.

§ A ratio of cation-exchange capacity (by 1N NaOAc pH 8.2) to percent clay (by weight).

☼ Base saturation calculated as sum of NH_4OAc-extracted bases divided by CEC (by 1N NaOAc pH 8.2).

▲ Coefficient of linear extensibility on a whole soil basis.

Table 5. Selected morphological, physical, and chemical characteristics of T-2 pimple mound edge pedons. †

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
		Chromic Vertic Hapludalf: Edge of pimple mound (Pedon 7021)						
Ap	0-12	73.7	21.5	4.8	FSL	10YR 4/3	1FSBK	5.4
E1	12-32	74.2	20.8	5.0	FSL	10YR 5/2	1MSBK	5.7
E2	32-50	73.4	21.2	5.4	FSL	10YR 5/4	1MSBK	6.0
Bt	50-61	60.7	19.8	19.5	FSL	10YR 5/6	2MSBK	6.1
Btss1	61-81	38.6	14.9	46.5	C	10YR 5/3	2MWEG	5.5
Btss2	81-103	44.4	14.3	41.3	C	10YR 5/4	2MWEG	5.0
B't1	103-135	54.0	14.0	32.0	SCL	10YR 5/6	2MABK	5.2
B't2	135-160	65.8	11.1	23.1	SCL	10YR 5/6	2MABK	5.2
B't3	160-191	75.3	8.8	15.9	FSL	10YR 6/6	1COSBK	5.2
C1	191-227	89.5	5.9	4.6	FS	10YR 7/3	0SGR	5.5
C2	227-256	84.6	1.9	13.5	LFS	7.5YR 5/6	0MA	5.3
Cg1	256-290	55.1	22.5	22.4	SCL	10BG 7/1	0MA	5.7
Cg2	290-317	68.2	17.6	14.2	FSL	2.5Y 7/2	0MA	6.1
		Chromic Vertic Hapludalf: Edge of pimple mound (Pedon 7023)						
Ap	0-15	72.4	21.2	6.4	FSL	10YR 3/3	1MSBK	6.0
A	15-32	74.4	19.7	5.9	FSL	10YR 4/3	1FSBK	6.5
E1	32-49	73.3	20.9	5.8	FSL	10YR 5/3	1MSBK	6.4
E2	49-62	71.8	21.8	6.4	FSL	10YR 5/4	1MSBK	6.4
Bt	62-75	62.3	19.8	17.9	FSL	10YR 5/4	2MSBK	6.2
Btss	75-96	39.9	15.7	44.4	C	10YR 5/3	2MWEG	4.8
Btv1	96-126	51.7	13.1	35.2	SC	10YR 5/3	2MABK	4.5
Btv2	126-150	61.6	10.7	27.7	SCL	2.5YR 4/6	2MABK	4.4
B't	150-190	73.8	6.6	19.6	FSL	10YR 5/6	1COSBK	4.4
BCt	190-215	82.3	3.6	14.1	FSL	10YR 5/6	1COSBK	4.7
Cg	215-247	90.6	4.8	4.6	FS	2.5Y 7/1	0SGR	5.8
C1	247-289	93.3	1.4	5.3	FS	7.5YR 5/6	0SGR	5.4
C2	289-322	80.7	5.4	13.9	FSL	10YR 5/6	0MA	5.6

† Horizon designation and coding according to Schoeneberger et al. (2002).

‡ Soil texture: C, clay; FS, fine sand; FSL, fine sandy loam; LFS, loamy fine sand; SC, sandy clay; SCL, sandy clay loam.

†† Soil matrix color identified by Munsell ® color notation.

§ Soil structure: Grade - 0 , structureless; 1, weak; 2, moderate; Size - F, fine; M, medium; CO, coarse; Type - ABK, angular blocky; MA, massive; SBK, subangular blocky; SGR, single grain; WEG, wedge.

intermound swale (pedon 2) has a base saturation of 83 percent at a depth of 167 cm, the pimple mound summit (pedon 3) has a base saturation of 49 percent at a depth of 180 cm, and the intermound swale (pedon 4) has a base saturation of 81 percent at a depth of 138 cm. The soil temperature regime for the study site is thermic with a mean annual air temperature of about 18.6° C. Soils are in both the udic and aquic soil moisture regimes and are quite heterogeneous with three great group classifications among the five sampled pedons within a linear distance of 42 m. Great groups identified include Endoaqualfs, Glossudalfs, and Hapludalfs. Fig. 19 shows the location of the five sampled pedons with respect to microtopography.

The intermound swale pedon 2 has an ochric epipedon to a depth of 42 cm, a glossic horizon from 42-61 cm, an argillic horizon from 42-230 cm, skeletans from 42-102 cm, pedogenic slickensides from 61-133 cm, and redoximorphic features throughout. The glossic horizon and skeletans indicate that clay is eluviating from the upper portion of the argillic horizon and possibly accumulating within the Btss horizon. Pedogenic slickensides and wedge shaped peds indicate the presence of vertic properties in horizons from 61-133 cm; this is supported by COLE values approaching or exceeding 0.6 cm/cm. Soil structure is subangular blocky changing to angular blocky and wedge in the upper portion of the solum. From a depth of 133-188 cm, the soil structure changes to coarse prismatic this parts to angular blocky before returning to subangular blocky. The underlying material is stratified structureless single grain fine sandy loam from a depth of 289-314 cm, and then stratified structureless single grain fine sand to the depth of sampling at 348 cm. The soil does not meet the aquic soil

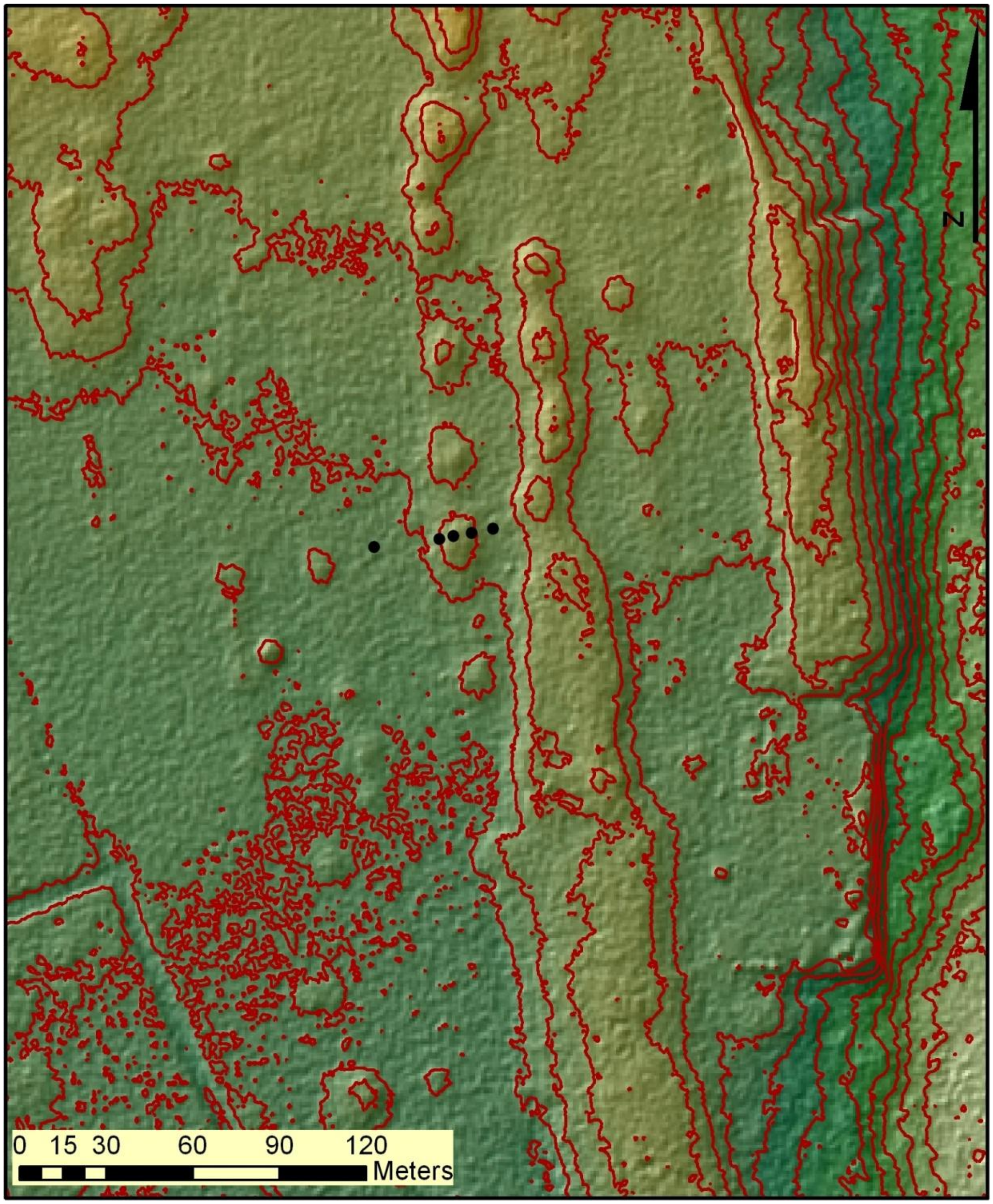


Fig. 19. Shaded relief image of T-2 (Middleton Quad) Site at 1:2,500 scale. Contour lines (red) and locations of the five sampled pedons (black circles) are indicated. Contour interval is 30 cm.

moisture regime according to soil taxonomy as it does not contain more than 50 percent redox depletions of chroma 2 or less within the upper 12.5 cm of the argillic horizon; it is therefore in the udic soil moisture regime and meets the criteria for the Udalfs. The presence of vertic properties from 61-133 cm, redox depletions within 25 cm of the upper boundary of the argillic horizon, aquic conditions in normal years, and a glossic horizon make Pedon 2 an Aquertic Glossudalfs. The particle-size control section from 42-92 cm averaged 32.5 percent clay content and more than 15 percent of the particles are fine sand or coarser, so the particle-size class is fine-loamy. Mineralogy was not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is considered siliceous. Cation-exchange capacity was obtained for this soil at pH 8.2, and CEC/Clay ratios averaged 0.52 in the control section. While this reading was not calculated at pH 7 as required in soil taxonomy, the value falls within the required range of 0.4 to 0.6 so the cation exchange activity class is active. The soil is classified as a fine-loamy, siliceous, active, thermic Aquertic Glossudalf and is not similar to any established soil series.

The pimple mound edge pedon (7021) has an ochric epipedon to a depth of 50 cm, an argillic horizon from 50-191 cm, pedogenic slickensides and wedge shaped peds from 61-103 cm, and redoximorphic features throughout the profile below a depth of 50 cm. Soil structure changes from subangular to angular blocky and wedge in the argillic horizon before returning to subangular blocky in the B’t3 horizon at a depth of 160 cm. The underlying material is stuctureless single grain fine sand from a depth of 191-227 cm, structureless massive loamy fine sand to a depth of 256 cm, structureless massive sandy clay loam to a depth of 290 cm, and at the depth of sampling at 317 cm is structureless massive fine sandy loam. The soil does not meet the aquic soil moisture regime criteria as it does not contain more than 50 percent redox depletions of chroma 2 or less within the upper 12.5 cm of the argillic horizon so it is in the udic soil moisture regime and an Udalf. The presence of vertic properties from 61-103 cm and an Ap horizon with a color value of 4 or more meets the criteria for Chromic Vertic Hapludalfs. The particle-size control section from 50-100 cm averaged 38.6 percent clay content making the particle-size class fine. Although mineralogy was not determined for this soil, morphological characteristics suggest smectitic mineralogy as do CEC/clay ratios of greater than 0.5 in surrounding soils. The soil is classified as a fine, smectitic, thermic Chromic Vertic Hapludalf and is not similar to any established soil series.

The pimple mound summit pedon 3 has an ochric epipedon to a depth of 79 cm, an argillic horizon from 79-220 cm, skeletans from 79-92 cm, and redoximorphic features throughout the pedon. Soil structure changes from subangular to angular blocky in the upper argillic horizon before returning to subangular blocky in the Bt4 horizon at a depth of 134 cm. The underlying C material is stratified stuctureless single grain loamy fine sand from a depth of 220 to 246 cm, and to the depth of sampling at 320 cm is stratified structureless massive fine sandy loam with vertical seams of coarser material. The soil does not have an aquic soil moisture regime as it does not contain more than 50 percent redox depletions of chroma 2 or less within the upper 12.5 cm of the argillic horizon so is in the udic soil moisture regime and an Udalf. The presence of albic materials within the Bt1 horizon met the criteria for Glossic Hapludalfs. The particle-size control section from 79-129 cm averages 32.2 percent clay content by weight, therefore the particle-size class is fine-loamy. Mineralogical analyses by X-ray diffraction of sand and silt separates (Appendix B) indicate that the 0.02-2 mm fraction is dominated by quartz and other siliceous minerals so the mineralogy class is siliceous. Cation-exchange capacity was obtained for this soil at pH 8.2, and CEC/clay ratios averaged 0.42 in the control section. While this reading was not calculated at pH 7 as required in soil taxonomy, the value falls within the required range of 0.4 to 0.6 so the cation exchange activity class is active or possibly semiactive. Therefore, the soil is classified as a fine-loamy, siliceous, active, thermic Glossic Hapludalf and is not similar to any established soil series.

The pimple mound edge pedon 7023 has an ochric epipedon to a depth of 62 cm, an argillic horizon from 62-215 cm, redoximorphic features throughout the profile, pedogenic slickensides from 75-96 cm, and plinthite nodules from 96-150 cm. Soil structure is subangular blocky at the surface and changes to wedge and angular blocky structure in the argillic horizon before returning to subangular blocky in the B’t horizon at a depth of 150 cm. The underlying C material is stuctureless single grain fine sand from a depth of 215-289 cm, and stratified structureless massive fine sandy loam to the depth of sampling at 322 cm. The soil does not have an aquic soil moisture regime as it does not contain more than 50 percent redox depletions of chroma 2 or less within the upper 12.5 cm of the argillic horizon; it is therefore in the udic soil moisture regime and a Udalf. The presence of vertic properties from 75-96 cm and an Ap horizon with a color value of 4 or more meet the criteria for Chromic Vertic Hapludalfs. The particle-size control section from 62-112 cm averaged 34.6 percent clay content, so the particle-size class is fine-loamy or fine. Mineralogy and cation-exchange capacity were not determined for this soil but, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is likely siliceous. Morphological characteristics indicating smectitic clay mineralogy and CEC/clay ratios of surrounding soils suggest a cation-exchange activity class of active. The soil is classified as a fine-loamy, siliceous, active, thermic Chromic Vertic Hapludalf and is not similar to any established soil series.

The intermound swale pedon 4 has an ochric epipedon to a depth of 13 cm, an argillic horizon from 13-284 cm, pedogenic slickensides and wedge shaped peds from 41-165 cm, gypsum accumulations from 165-205 cm, and redoximorphic features throughout the pedon. Soil structure is subangular blocky at the surface and changes to angular blocky and wedge structure in the argillic horizon before returning to subangular blocky in the Btyg1 horizon at a depth of 165 cm. The underlying sediments are stratified stuctureless massive very fine sandy loam from a depth of 284 cm to the depth of sampling at 337 cm. The soil meets the aquic soil moisture regime as it contains more than 50 percent redox depletions of chroma 2 or less within the upper 12.5 cm of the argillic horizon so it is an Aqualf. The presence of vertic morphological features from 41-165 cm, an average linear extensibility of 9.9 cm from 0-100 cm, and an Ap horizon with a color value of 4 or more meets the criteria for Chromic Vertic Endoaqualfs. The particle-size control section from 13-63 cm averages 37.9 percent clay content, so the particle-size class is fine. Mineralogy was not determined for this soil by X-ray diffraction, but morphological characteristics and an average CEC/clay ratio of 0.66 suggest smectitic mineralogy. The soil is classified as a fine, smectitic, thermic Chromic Vertic Endoaqualf and is not similar to any established soil series.

Endosaturation and Episaturation

Figure 20 shows the horizons identified in the five soil pedons of the T-2 (Middleton) Site relative to elevation with special emphasis given to reduced matrix colors or gleyed horizons. Intermound pedon 4 exhibited gleyed horizons (soil matrix colors of chroma 2 or less) indicative of saturation in normal years within 50 cm of the soil surface, and given a classification in the suborder of Aqualfs. This pedon was saturated at a depth of 240 cm at the time of sampling. Pedon 2, in the other intermound swale position is at a slightly higher elevation, and while in a water receiving position, may receive less surface and subsurface flow than the lower and broader intermound represented by pedon 4. Pedon 2 has gleyed horizons (soil matrix colors of chroma 2 or less) indicative of saturation in normal years within 100 cm of the soil surface as reflected in the Aquertic subgroup classification. This pedon also was saturated at a depth of 270 cm at the time of sampling.

Other sampled pedons at this site exhibit characteristics that are indicative of perched water tables at times within 100 cm in normal years, but the soils of the pimple mound summit and edges do not exhibit features indicative of prolonged saturation, rather alternating periods of wetting and drying. Indicators supporting this observation include glossic features, iron depletions, and abrupt textural changes together with the

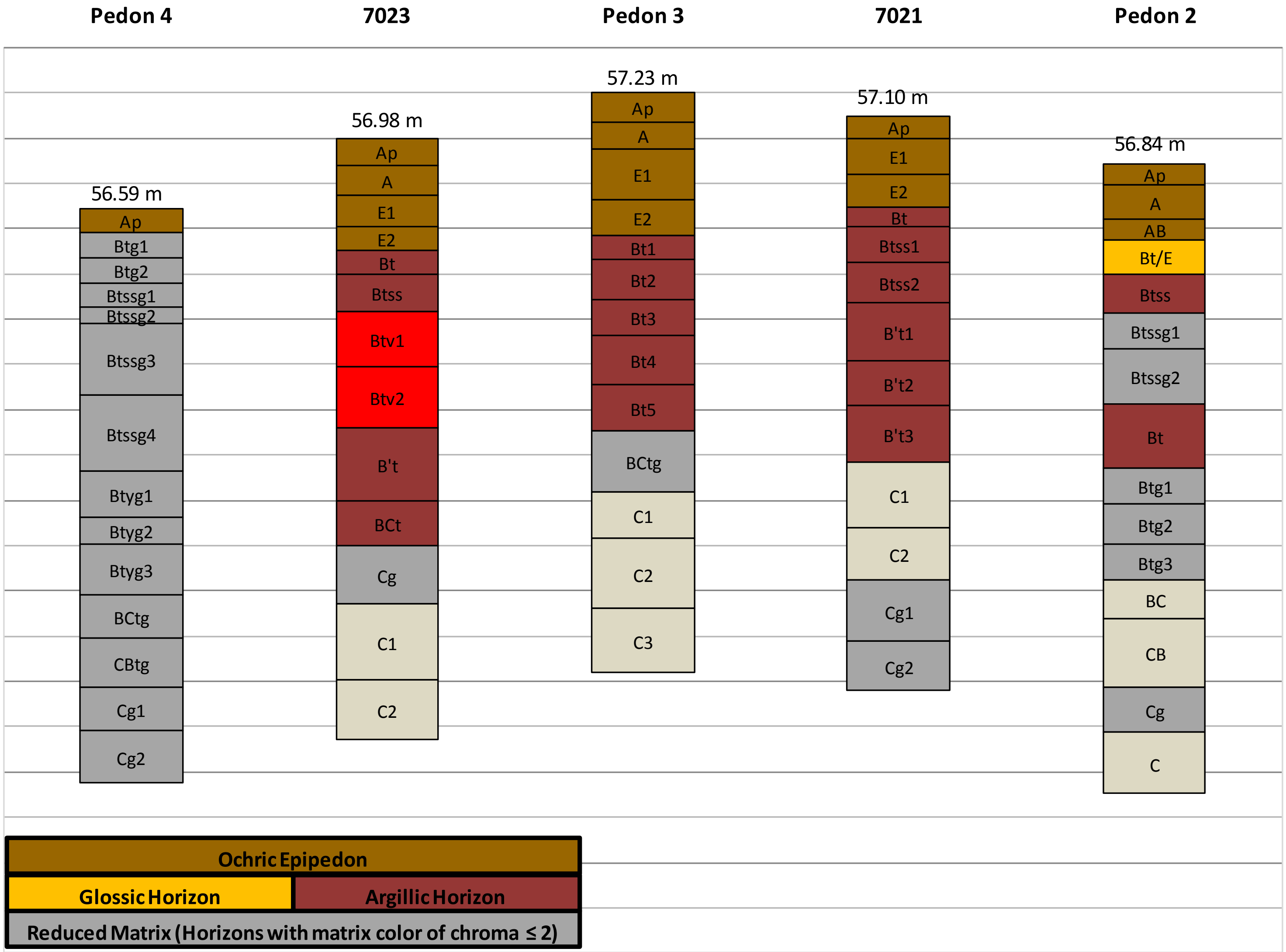


Fig. 20. Observed soil horizons by pedon relative to elevation at T-2 (Middleton Quad) Site. Vertical axis interval is 25 cm.

presence of slickensides. Albic materials or skeletans in the pimple mound summit (pedon 3) and a glossic horizon in the intermound swale (pedon 2) suggest that argillic horizons are being degraded by water movement. This perching of water followed by drying of the soil may lead to the process of ferrolysis in these soils. In the glossic horizon present in pedon 2, pH values (5.1) are sufficiently low to support ferrolysis, but in the Bt1 horizon of pedon 3 where albic materials or skeletans were observed, the pH of 6.1, is higher than expected.

A normal percolative moisture regime might be expected at this site given the humid climate together with a slope of one percent across the study site, but what is observed is a situation where the moisture regime varies seasonally, amphipercolative (Yaalon, 1983). At the time of sampling an extreme example of this seasonal fluctuation was observed. During normal years these fluctuations may regularly occur although not as drastic. This allows for periods in which precipitation exceeds evaporation and leads to ponding of water in lower topographic positions, and a general downward movement of water, followed by periods in which evaporation exceeds precipitation and upward movement of water occurs at the capillary fringe of water tables.

A discussion of upward water movement in these soils should begin with a discussion of the underlying occluded aquifer. At this site a water table was present at the time of sampling, and although finer sediments were not observed to the depth of sampling, this site is likely underlain by a stratified water restrictive layer of fine sediments as has been observed at other sites. While the microtopography of this site resembles the younger T-1 site, the soil chemistry and possibly groundwater chemistry appear to better resemble the highly leached and more acidic soils of the older T-4 and T-5 sites. This site appears to have a complex leaching environment with acidic pH values of < 5.0 below a depth of 220 cm coupled with ESP of five percent and SAR as high as 4.

The presence of a glossic horizon, light brownish gray (10YR 6/2) iron depletions, and the presence of skeletans on the vertical faces of peds in pedon 2 suggest perching of water at a depth of 42-83 cm. Although water may perch at various times throughout the lower portion of the sampled pedon, during the extreme drought conditions at the time of sampling, a water table was present at 270 cm. During normal years the water may fluctuate within a depth of 83 cm of the surface and above the gleyed Btssg1 horizon. This is expected to be a seasonal occurrence in which this horizon perches water and horizons above actually experience degradation of clay as indicated by the presence of skeletans.

The abrupt textural and structural change associated with the Btss1 horizon in pedon 7021 at a depth of 61 cm may be associated with the perching of water at this depth, yet the lack of redoximorphic features with a chroma of less than 2 suggest that this horizon serves as an aquitard and directs water flow to the intermound area represented by pedon 2 while accumulating clay from downward water movement. The light brownish gray (10YR 6/2) iron depletions observed below a depth of 103 cm underlie the aquitard created by the horizons of slickensides and wedge shaped peds. These gleyed colors may be associated with the occluded aquifer observed in pedons 2, 4, and 7023.

The presence of albic materials (skeletans) and the abrupt textural change at a depth of 70 cm in pedon 3 suggest episaturation occurs in normal years. The depths to the top of the argillic horizon were measured at a 1 m interval along the length of the 44 m continuous trench and plotted with respect to the mound surface (Fig. 21). The “bowl shaped” subsurface microtopography of the textural change between the mound surface and the argillic horizon indicates the possibility for ponding of water within this subsurface region during high rainfall events. While the mound surface likely directs runoff water to the intermounds via surface flow, water which enters at the pimple mound summit and edges is likely directed downward and with time may provide an acidic weathering environment which degrades and moves clay minerals downward and leaches bases. Measureable electrical conductivity and increased ESP in the lower horizons of this pedon suggest that water from the underlying occluded aquifer inundates within a depth of 220 cm seasonally.

The “bowl shaped” subsurface microtopography, outlined by the argillic horizon in Fig. 21, may be related to the downward movement and translocation of clay size particles within the mound relative to the additions of clay size sediments during the settling of flood waters which occasionally inundate the intermounds of the T-2 site today. While the intermounds undergo similar translocations of clay, these areas also receive additions of clays today while few of these fine sediments are deposited on the mound surface.

The abrupt textural and structural change associated with the Btss horizon in pedon 7023 at a depth of 75 cm may be associated with the perching of water at this

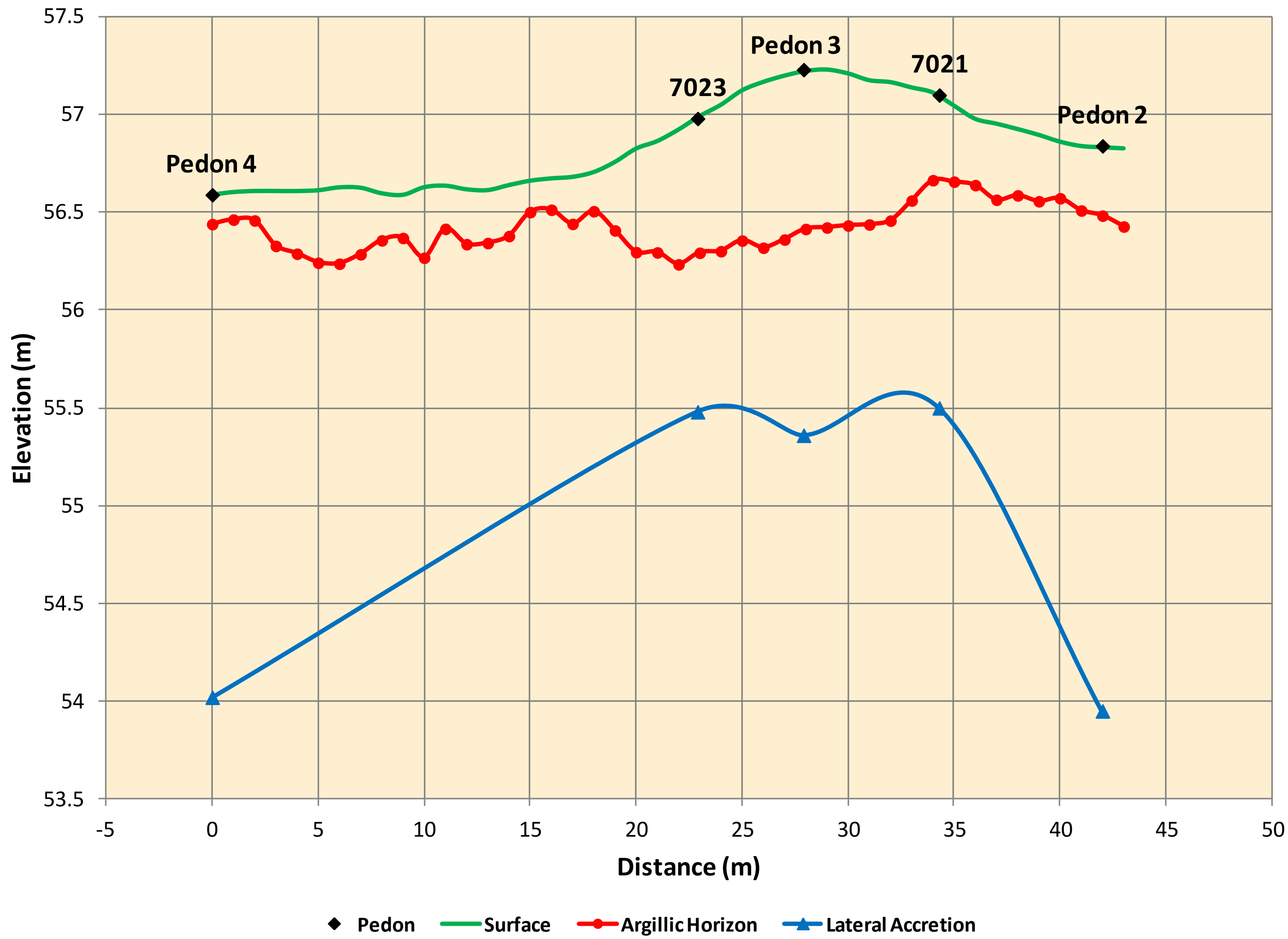


Fig. 21. Relation of lateral accretion and argillic horizon to modern topography at T-2 (Middleton Quad) Site.

depth, yet the lack of redoximorphic features with a chroma of less than 2 suggest that this horizon serves as an aquitard and directs water flow to the intermound area represented by pedon 4 or at times may accumulate water within this region associated with the mound summit as mentioned previously for downward water movement. The light brownish gray (10YR 6/2) iron depletions observed below a depth of 126 cm underlie the aquitard created by the slickensides and wedge shaped peds of the Btss1 horizon, so these gleyed colors may be associated with the occluded aquifer observed at a depth of 240 cm. The plinthite nodules from 96-150 cm may have been aided in formation by a seasonal groundwater table where these features are within the capillary fringe of an occluded aquifer at times which allows for the necessary wetting and drying forming these features in the presence of sufficient iron.

Gleyed horizons throughout pedon 4 suggest that this pedon receives water from surface and subsurface flow from surrounding higher positions during precipitation events. Also, water saturation occurs in association with flooding of the Trinity River. The presence of gypsum at a depth of 165 cm suggests that waters high in calcium sulfate may be present in the underlying groundwater which may precipitate gypsum in the capillary fringe above the water table. Gypsum and other soluble salts are frequently present in soils of drier regions, but when present in groundwater, this mineral can be deposited in soils with the upward movement of gypsum saturated groundwater.

Depositional Environment

The heterogeneity of the soils of the T-2 (Middleton Quad) Site is attributed to its fluvial depositional environment, but is also influenced significantly by the soil water relationships and modern flood events. At the time of deposition, the paleoriver may have followed the general path illustrated by the black line in Fig. 22. The possible river path is visualized by the general trend of arcuate rows of mounds and curvilinear ridges across the expanse of the T-2 terrace. The proposed movement of the river relative to its meander at the point of sampling is in a west-southwest direction with point bar deposits being laid down from east-northeast to west-southwest.

The sampling site is situated in a position in which when the paleoriver was at this level would have received substantial inundation and deposition as the river would have been cutting with its concave bank into the much higher T-4 and T-5 deposits as illustrated by Fig. 18. After the paleoriver down cut to the T-1 level, this site would have received many flood events from the river while near its western boundary.

Presently, the T-2 site is inundated by floodwaters when the modern Trinity River reaches its highest flood stage. A flood event which inundated this site was described by an employee of an oil field service company who visited the sampling site during the high flood stage of the Trinity River in December 1991 to January 1992. Floods such as this described event and other more powerful floods occurred throughout the late Pleistocene and into the Holocene providing sediments, especially fines to the intermound areas throughout their depositional history. Only after further downcutting of the river would this site enter a phase like that of the T-3 and higher terraces, one in

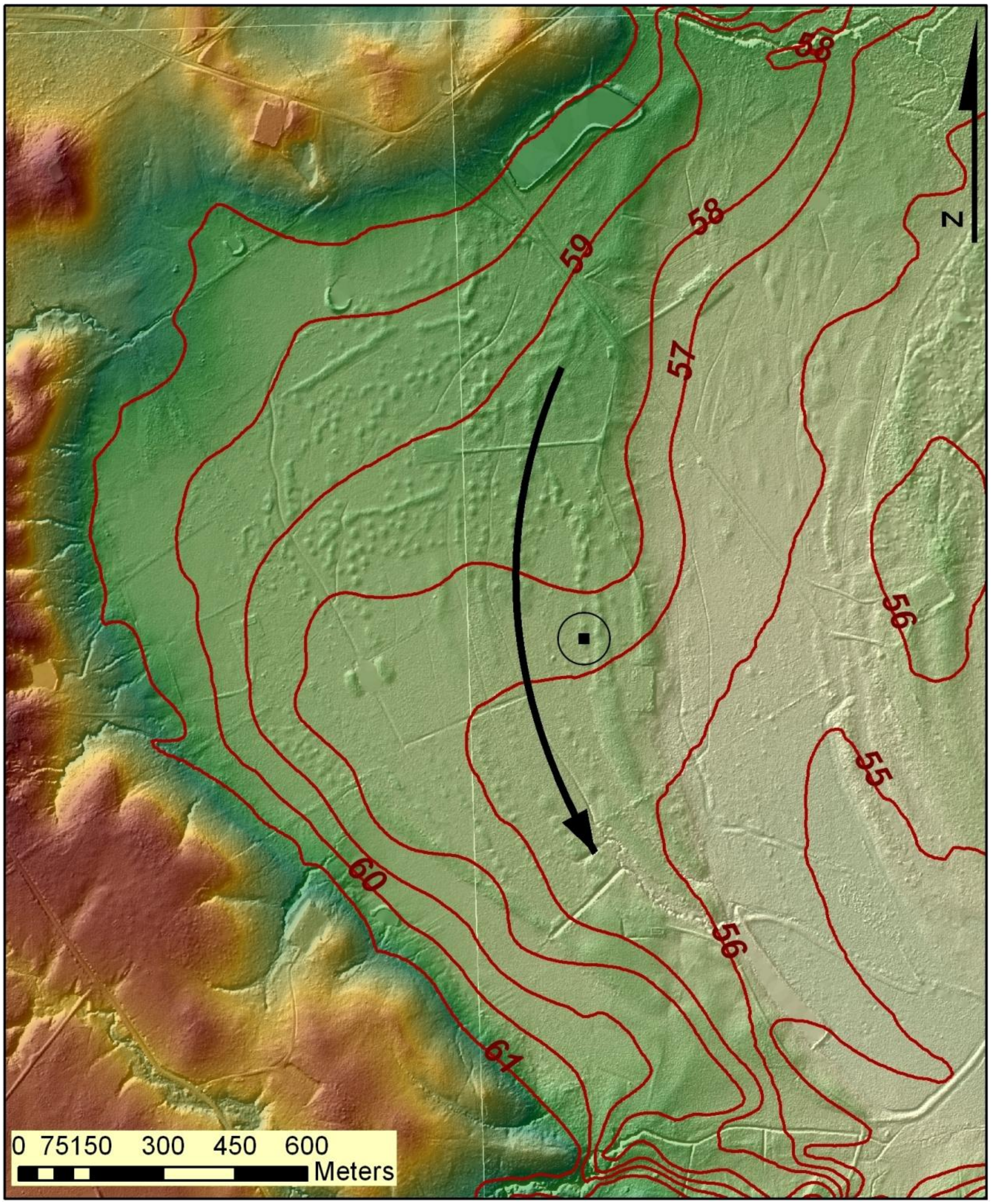


Fig. 22. Shaded relief image of the T-2 (Middleton Quad) Site at 1:15,000 scale. Contour lines (red) and sampling location (point within a circle) illustrate site with respect to surrounding landscape. Contour interval of 1m. Black line indicates the general trend of the meandering paleoriver at the time of deposition.

which erosion supersedes deposition. This complex depositional history is one which is relived on each of these terrace levels and within their pimple mounds.

This site's depositional history shows two general trends in the overbank deposits (Fig. 23 and 24). At about a 2-m depth in all pedons (2.5 m in the lower intermound pedon 4) a fining trend begins associated with the overbank deposits, and at about 75 cm depth in all pedons (1.5 m in the lower intermound pedon 4) a slight coarsening trend occurs. These trends are observed in intermounds and pimple mound pedons indicating that this is a fluvial depositional trend and not associated with eolian deposition in the mounds. The general trends of particle size expressed on a clay-free basis, are observed in all pedons beginning with the base sediments with a mean particle size of about 125 µm or coarser, and a fining upward to a mean particle size of less than 100 µm. The intermound swales represented by pedons 2 and 4 showed the finest mean particle size of < 75 µm. The degree of sorting of sediments based on the standard deviation of the clay-free particle sizes, trends toward moderate or well sorting at the deeper samplings (Fig. 24). These lower standard deviations are associated with the lateral accretion deposits.

A fining upward trend present in the base sediments of pedons 2, 3, and 7021 was not captured within the depth of sampling of pedons 4 and 7023. This may be related to the variability of point bar deposits across their cross section or may have been captured by a deeper sampling of these pedons. Even with the absence of this trend the similar depositional environment of all five pedons is evident.

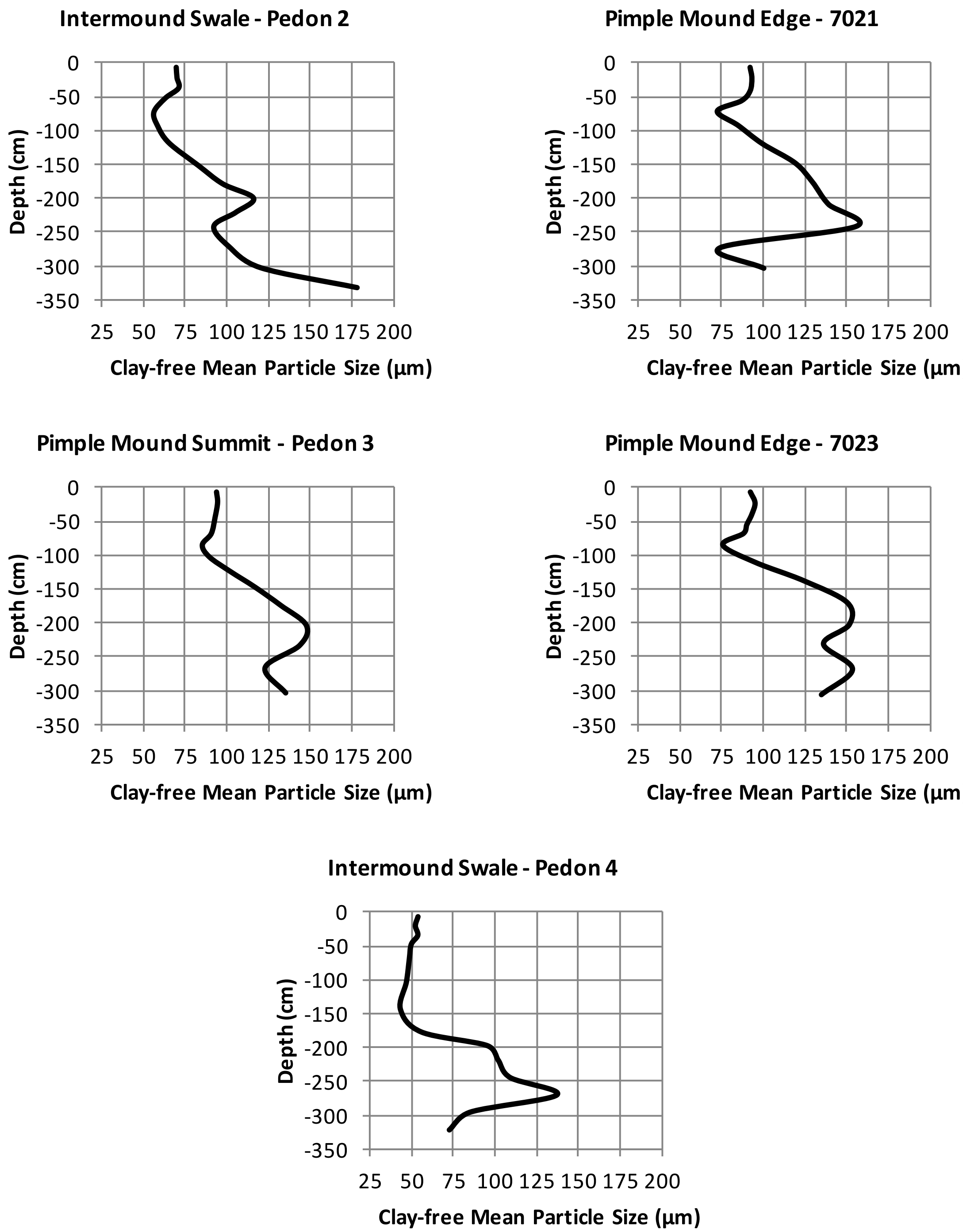


Fig. 23. Clay-free mean particle size (2-2000 µm fraction) with depth for the study soils at the T-2 (Middleton Quad) Site. Pedons identified in relation to pimple mound and intermound positions.

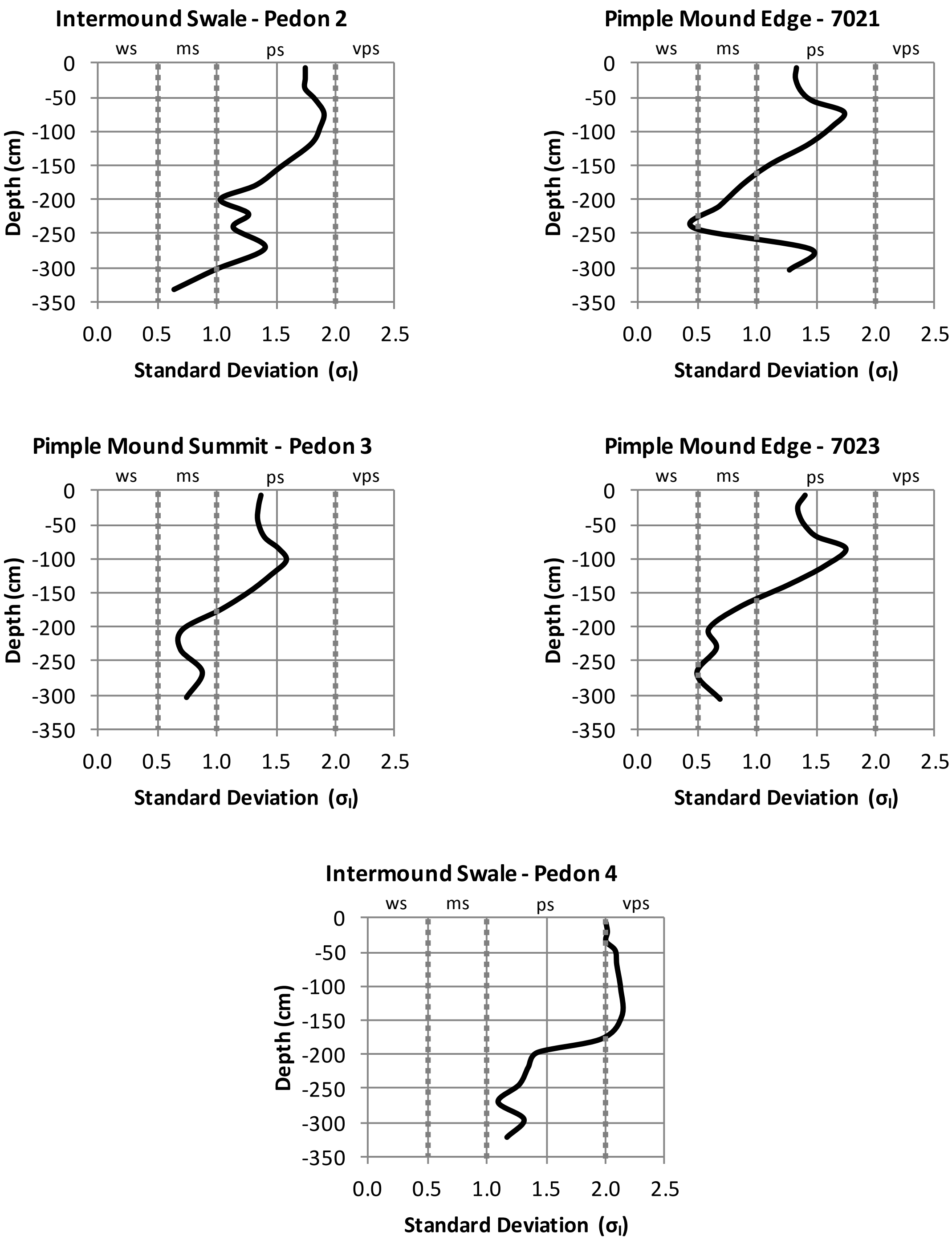


Fig. 24. Clay-free standard deviation of particle size distribution with depth for the study soils at the T-2 (Middleton Quad) Site. Letters along the top margin give verbal limits for standard deviation: ws, well sorted; ms, moderately sorted; ps, poorly sorted; vps, very poorly sorted. Pedons are identified in relation to pimple mound, and intermound positions.

Zone of Lateral Accretion

Further evidence of a fluvial origin is shown in Fig. 21 when the soil surface is compared to the top of materials deposited by lateral accretion. This relationship provides evidence that the pimple mounds at this site are residual components of accretion ridges on point bar deposits associated with the meandering of the paleoriver as is illustrated by the curvilinear rows of mounds and ridges in Fig. 19. While clay and silt-size particles were deposited during the stage of a lateral accretion, depositional environment, most of the fine particles in this system were deposited by vertical accretion during the river's slow retreat to the west, during its later downcutting to the T-1 level, and during major flood events today.

The dynamic nature of rivers and fluvial environments makes determining vertical accretion from lateral accretion a difficult task. The decision considered the clay-free mean particle size, total sand content, and degree of sorting. The degree of sorting quantified by standard deviation of clay-free sediments was given the greatest weight.

The sediments of the zone of lateral accretion were deposited in a higher velocity depositional environment than the overbank deposits in the zone of vertical accretion, so the sediments of lateral accretion would be coarser than those of vertical accretion. At this site poorly sorted sediments with a standard deviation greater than 1.0 are assigned to the zone of vertical accretion, while moderately and well sorted sediments with a standard deviation of less than 1.0 are assigned to lateral accretion. This differed in pedon 4 in which this pedon's position near the former channel may explain the variability in degree of sorting in which the surface sediments were very poorly sorted (standard deviation of >2.0) and the base sediments were poorly sorted, but approached moderate sorting.

The zone of lateral accretion in pedon 2 begins at a depth of 289 cm and the top of the Cg horizon. Data supporting this conclusion include an increase in total sand from 64.1 to 77.8 percent, a coarsening of the clay-free mean particle size from 101 to 120 µm, and a transition from poorly sorted sediments (standard deviation of 1.4) to moderately sorted sediments (standard deviation of 1.0).

Lateral accretion in pedon 7021 begins at a depth of 160 cm and the top of the B’t3 horizon. Data supporting this conclusion include an increase in total sand from 65.8 to 75.3 percent, a coarsening of the clay-free mean particle size from 119 to 129 µm, and a transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.9).

The zone of lateral accretion in pedon 3 begins at a depth of 187 cm and the top of the BCtg horizon. Support for this depth include an increase in total sand from 67.9 to 83.1 percent, a coarsening of the clay-free mean particle size from 132 to 148 µm, and a transition from poorly sorted sediments (standard deviation of 1.0) to moderately sorted sediments (standard deviation of 0.7).

Lateral accretion in pedon 7023 begins at a depth of 150 cm and the top of the B’t horizon. Data supporting this conclusion include an increase in total sand from 61.6 to 73.8 percent, a coarsening of the clay-free mean particle size from 125 to 151 µm, and a transition from poorly sorted sediments (standard deviation of 1.3) to moderately sorted sediments (standard deviation of 0.9).

The zone of lateral accretion in pedon 4 was considered to begin at a depth of 257 cm and the top of the CBtg horizon. This is supported by an increase in total sand from 66.5 to 76.9 percent, a coarsening of the clay-free mean particle size from 110 to 137 µm, and a transition from poorly sorted sediments (standard deviation of 1.3) to poorly sorted sediments (standard deviation of 1.1).

T-4 (Lake Leon Quad) Site

Table 6 provides selected morphological, physical and chemical characteristics of the soils sampled at the T-4 Site. Complete morphological descriptions are provided in Appendix A and complete physical and chemical data are provided in Appendix B. Figure 24 shows the orientation of the five sampled pedons with respect to microtopography.

Morphology and Classification of Soils

All sampled pedons at this site (7025-7029) have an ochric epipedon and an argillic horizon with a base saturation estimated to be greater than 35 percent at a depth of 180-200 cm which meets the criteria for Alfisols and a soil moisture regime of udic which meets the criteria for Udalfs. The pH values, degree of pedogenesis, solum thickness, and weathering within the sampled pedons of the older T-4 level may have allowed for enough leaching of exchangeable bases during the development of these

Table 6. Selected morphological, physical, and chemical characteristics of T-4 pimple mound and intermound pedons. †

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
					Aquic Glossudalf: Intermound (7025)			
Ap	0-9	55.0	38.4	6.6	VFSL	10YR 5/3	1MGR & 2MSBK	5.4
E	9-38	55.1	35.2	9.7	VFSL	7.5YR 6/3	1MSBK	4.8
E/Bt	38-59	56.6	28.3	15.1	VFSL	10YR 6/3	1MSBK	4.7
Btg1	59-93	32.8	16.3	50.9	C	10YR 6/2	2MABK	4.7
Btg2	93-147	36.3	19.3	44.4	C	10YR 6/2	2MABK	4.8
Btg3	147-194	35.5	28.4	36.1	CL	10YR 6/2	2MABK	4.9
Bt1	194-231	27.7	36.3	36.0	CL	10YR 6/4	2MABK	4.8
Bt2	231-293	48.6	21.0	30.4	SCL	10YR 6/6	1MSBK	5.0
B'tg	293-336	21.4	38.3	40.3	C	10YR 6/2	1COSBK	4.8
BC	336-413	14.4	50.5	35.1	SiCL	7.5YR 5/6	1COSBK	4.5
C1	413-439	5.4	38.3	56.3	C	10YR 6/4	0MA	4.4
C2	439-515	2.9	36.1	61.0	C	10YR 6/4	0MA	4.4
C3	515-535	54.4	28.2	17.4	VFSL	10YR 5/6	0MA	5.0
					Glossaquic Paleudalf: Edge of pimple mound (7026)			
Ap	0-15	70.6	25.0	4.4	VFSL	10YR 5/3	1MSBK	6.1
E	15-39	67.1	27.0	5.9	VFSL	10YR 6/3	1MSBK	5.8
E/Bt	39-70	64.2	28.1	7.7	VFSL	10YR 6/3	2MSBK	4.8
Bt/E	70-123	58.5	26.1	15.4	VFSL	10YR 6/6	3MSBK	4.7
Bt	123-167	39.8	19.4	40.8	C	10YR 5/6	2MABK	4.7
Btg1	167-197	43.6	18.9	37.5	CL	10YR 6/2	2MABK	4.9
Btg2	197-244	46.0	19.4	34.6	SCL	10YR 6/2	2MABK	5.1
Btg3	244-310	49.4	22.2	28.4	SCL	10YR 6/2	2MSBK	5.1
BCt	310-344	3.2	38.3	58.5	C	10YR 5/6	1COSBK	4.8
CBt	344-398	13.9	52.4	33.7	SiCL	10YR 6/6	1COSBK	4.8
CBtg	398-435	5.8	53.1	41.1	SiC	10YR 7/2	1COSBK	4.7
C1	435-508	4.9	38.8	56.3	C	7.5YR 5/6	0MA	4.6
C2	508-540	21.8	44.1	34.1	CL	7.5 YR 5/6	0MA	4.9
C3	540-600	61.2	23.1	15.7	VFSL	7.5YR 5/6	0MA	6.0
					Glossic Paleudalf: Summit of pimple mound (7027)			
A	0-22	64.7	30.9	4.4	VFSL	10YR 5/3	1MSBK	6.0
E	22-76	65.7	29.5	4.8	VFSL	10YR 6/3	1MSBK	4.9
E/Bt	76-98	63.7	28.7	7.6	VFSL	10YR 6/3	2MSBK	4.5
Bt/E	98-160	60.4	27.2	12.4	VFSL	10YR 6/3	2MSBK	4.6
Bt	160-208	41.6	21.4	37.0	CL	10YR 5/6	2MABK	4.6
Btg1	208-232	39.3	20.5	40.2	C	10YR 6/2	2MABK	4.4
Btg2	232-265	41.6	23.9	34.5	CL	10YR 6/2	2MABK	4.6
Btg3	265-313	38.6	28.9	32.5	CL	10YR 7/2	2MABK	4.6
Btg4	313-380	39.7	28.1	32.2	CL	10YR 7/2	2MSBK	4.7
BCtg	380-402	8.4	43.7	47.9	SiC	10YR 7/2	1MABK	4.7
CB	402-503	7.5	51.4	41.1	SiC	10YR 5/6	0MA	4.8
C1	503-542	30.5	36.4	33.1	CL	7.5YR 5/6	0MA	4.8
C2	542-570	59.0	25.0	16.0	VFSL	10YR 5/8	0MA	5.1

Table 6 Continued.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
				Glossic Paleudalf: Edge of pimple mound (7028)				
Ap	0-15	64.7	30.7	4.6	VFSL	10YR 4/3	2F&MSBK	7.6
E	15-36	65.1	30.1	4.8	VFSL	10YR 6/3	1MSBK	7.7
E/Bt	36-70	61.9	29.6	8.5	VFSL	10YR 6/3	2MSBK	6.5
Bt/E	70-123	57.3	26.1	16.6	VFSL	10YR 5/6	2MSBK	4.8
Bt	123-190	37.7	19.8	42.5	C	10YR 6/2	2MABK	4.8
Btg1	190-250	44.0	23.2	32.8	CL	10YR 6/2	2MABK	4.9
Btg2	250-274	34.7	26.6	38.7	CL	10YR 7/2	2MABK	4.9
B't	274-301	52.7	22.9	24.4	SCL	10YR 6/6	2MSBK	5.2
BCtg	301-339	4.1	38.4	57.5	C	10YR 6/2	1COSBK	4.7
BCt	339-389	11.8	48.6	39.6	SiCL	10YR 6/6	1COSBK	4.7
CB	389-430	7.6	40.2	52.2	SiC	7.5YR 5/6	0MA	4.7
C1	430-457	55.0	28.1	16.9	VFSL	10YR 6/6	0MA	5.1
C2	457-510	62.2	22.9	14.9	VFSL	10YR 5/6	0MA	5.2
				Albaquic Paleudalf: Intermound (7029)				
Ap	0-10	53.0	40.4	6.6	VFSL	10YR 5/3	1F&MSBK	5.5
E	10-36	54.6	38.5	6.9	VFSL	10YR 6/3	2MSBK	5.4
Bt1	36-68	40.2	24.7	35.1	CL	10YR 5/6	2MABK	4.9
Bt2	68-128	47.9	23.1	29.0	SCL	10YR 5/4	2MABK	5.9
Bt3	128-153	46.8	23.3	29.9	SCL	10YR 6/4	2MABK	6.6
Btg1	153-189	43.9	24.6	31.5	CL	10YR 6/2	2MABK	6.4
Btg2	189-226	36.8	30.2	33.0	CL	10YR 6/2	2MABK	5.9
B't	226-263	8.4	36.6	55.0	C	10YR 6/6	2MSBK	5.1
BC	263-314	6.9	50.3	42.8	SiC	7.5YR 5/4	1COSBK	5.1
CB	314-333	3.7	37.4	58.9	C	7.5YR 5/4	0MA	5.0
C1	333-362	42.5	33.3	24.2	L	10YR 5/6	0MA	5.3
C2	362-390	57.9	25.7	16.4	VFSL	10YR 5/6	0MA	5.5

† Horizon designation and coding according to Schoeneberger et al. (2002).

‡ Soil texture: C, clay; CL, clay loam; L, loam; SCL, sandy clay loam; SiC, silty clay; SiCL, silty clay loam; VFSL, very fine sandy loam.

†† Soil matrix color identified by Munsell ® color notation.

§ Soil structure: Grade - 0 , structureless; 1, weak; 2, moderate; 3, strong; Size - F, fine; M, medium; CO, coarse; Type - ABK, angular blocky; GR, granular; MA, massive; SBK, subangular blocky; &, and.

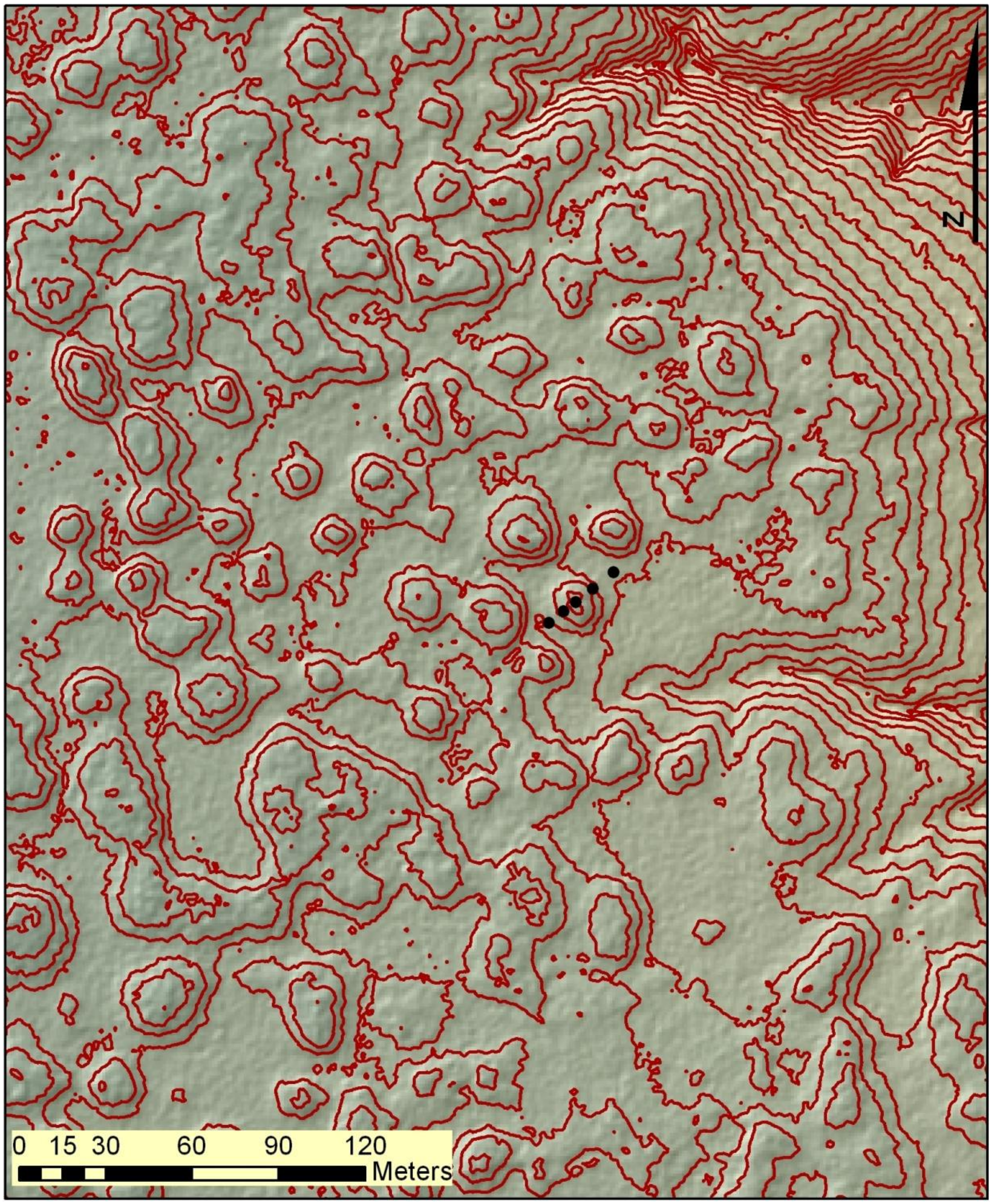


Fig. 25. Shaded relief image of T-4 (Lake Leon Quad) Site at 1:2,500 scale. Contour lines (red) and locations of the five sampled pedons (black circles) are indicated. Contour interval is 30 cm.

soils for the base saturation at a depth of 180-200 cm to be less than 35 percent which would meet the criteria for Ultisols and Udults. Base saturation and CEC were not determined on these pedons, but would provide an interesting data set for consideration with respect to soil development and weathering of clay minerals over time. The soil temperature regime for the study site is thermic with a mean annual air temperature of about 18.6° C. The soils of this site are more homogenous than the soils of the younger lower level terrace study sites with two great group classifications identified among the five sampled pedons within a linear distance of 29 m. Great groups identified are Glossudalfs and Paleudalfs.

The intermound pedon 7025 has an ochric epipedon to a depth of 38 cm, a glossic horizon from 38-59 cm, an argillic horizon from 38-336 cm, skeletans underlying the glossic horizon from 59-93 cm, and redoximorphic features throughout. The glossic horizon and skeletans indicate that clay is eluviating from the upper portion of the argillic horizon and possibly accumulating within the Btg1 horizon. Soil structure changes from subangular to angular blocky in the upper portion of the solum from a depth of 59-231 cm before becoming subangular blocky again. The underlying sediments are stratified structureless massive clay from a depth of 413-515 cm and stratified structureless massive very fine sandy loam to the depth of sampling at 535 cm. The presence of a glossic horizon, skeletans with a chroma of 2 or less within the upper 25 cm of the argillic and aquic conditions for some time in normal years meet the criteria for Aquic Glossudalfs. The particle-size control section from 38-88 cm averaged 35.9 percent clay content, so the particle-size class is fine. Mineralogy and cation-exchange capacity were not determined for this soil. Despite the presence of two horizons (Btg1 and Btg2) from 59-147 cm with a high clay content (50.9 and 44.4 percent), vertic features were not observed in this pedon. The absence of smectitic features in this pedon may serve as an indication of the intense weathering and acidification that may occur due to the process of ferrolysis as suggested by the glossic horizon and skeletans in the upper argillic horizon. The mineralogy class is likely mixed, and the cation-exchange activity class is likely active so the soil is classified as a fine, mixed, active, thermic Aquic Glossudalf and is similar to the Rodessa soil series which is typically found on uplands and terraces of the Southern Coastal Plains of northeastern Texas. The typical pedon for Rodessa is found near Clarksville in Red River County, Texas.

The pimple mound edge pedon 7026 has an ochric epipedon to a depth of 39 cm, a glossic horizon from 39-123 cm, an argillic horizon from 70-435 cm, skeletans on the vertical faces of peds from 39-123 cm, and redoximorphic features throughout the profile below a depth of 15 cm. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the Btg3 horizon at a depth of 244 cm. The underlying material is stuctureless massive clay from a depth of 435-508 cm, stratified structureless massive clay loam to a depth of 540 cm, and to the depth of sampling at 600 cm is structureless massive very fine sandy loam. Due to the presence of a glossic horizon, together with a clay increase with depth to 167 cm, and the presence of many (20 percent) coarse redox concentrations with a red (2.5YR 4/6) color in the Btg2 horizon, this soil is a Glossic Paleudalf. The particle-size control section from 70-120 cm averaged 15.4 percent clay content and 15 percent or more particles of fine sand or coarser; therefore the particle-size class is coarse-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is siliceous, and the cation-exchange activity class is likely active given the general lack of indications of smectitic mineralogy in surrounding soils. The soil is classified as a coarse-loamy, siliceous, active, thermic Glossic Paleudalf and is similar to the Gallime soil series typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

The pimple mound summit pedon 7027 has an ochric epipedon to a depth of 76 cm, a glossic horizon from 76-160 cm, an argillic horizon from 98-402 cm, skeletans on the vertical faces of peds from 98-160 cm, barite crystals from 265-313 cm, and redoximorphic features throughout the profile below a depth of 22 cm. Soil structure changes from subangular to angular blocky in the upper argillic horizon before returning to subangular blocky in the Btg4 horizon at a depth of 313 cm. The underlying C material is stuctureless massive clay loam from a depth of 503-542 cm, and to the depth of sampling at 570 cm is structureless massive very fine sandy loam. The presence of many (35 percent) coarse red (2.5YR 5/8) redoximorphic concentrations in the Bt horizon from 160-208 cm, a clay increase to a depth of 232 cm in the Btg2 horizon, together with a glossic horizon, meet the criteria for Glossic Paleudalfs. The particle-size control section from 98-148 cm is 12.4 percent clay content and 15 percent or more particles of fine sand or coarser; therefore, the particle-size class is coarse-loamy.

Mineralogy and cation-exchange capacity were not determined for this soil, but this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is siliceous, and the cation-exchange activity class is considered active given the general lack of indications of smectitic mineralogy in surrounding soils. The soil is classified as a coarse-loamy, siliceous, active, thermic Glossic Paleudalf and is similar to the Gallime soil series which is typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

The pimple mound edge pedon 7028 has an ochric epipedon to a depth of 36 cm, a glossic horizon from 36-123 cm, an argillic horizon from 70-389 cm, redoximorphic features throughout the profile below a depth of 36 cm, and barite crystals from 250-274 cm. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the B't horizon at a depth of 274 cm. The underlying C material is stuctureless massive very fine sandy loam below a depth of 430 cm to the depth of sampling at 510 cm. The presence of many (30 percent) coarse red (2.5YR 4/6) redoximorphic concentrations in the Bt horizon from a depth of 123-190 cm, a clay increase to a depth of 190 cm, together with a glossic horizon, meet the criteria for Glossic Paleudalfs. The particle-size control section from 70-120 cm averages 16.6 percent clay content and 15 percent or more particles of fine sand or coarser; therefore the particle-size class is coarse-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is siliceous, and the cation-exchange activity class is likely active given the general lack of indications of smectitic mineralogy in surrounding soils. The soil is classified as a coarse-loamy, siliceous, active, thermic Glossic Paleudalf and is similar to the Gallime soil series which is typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

The intermound pedon 7029 has an ochric epipedon to a depth of 36 cm, an argillic horizon from 36-263 cm, sand coats from 36-128 cm, and redoximorphic features throughout the profile below a depth of 36 cm. The features described in the field as sand coats in the Bt1 and Bt2 horizons may be skeletans indicating the degradation of the upper argillic horizon with further evidence provided by a slight increase in clay content in the Bt3 and Btg1 horizons. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the B’t horizon at a depth of 226 cm. The underlying sediments are stuctureless massive loam from a depth of 333-362 cm, and structureless massive very fine sandy loam to the depth of sampling at 390 cm. The presence of many (20 percent) coarse yellowish red (5YR 5/6) redoximorphic concentrations in the Btg2 horizon from a depth of 189-226 cm, a clay decrease of not more than 20 percent relative within 150 cm of the mineral soil surface, light brownish gray (10YR 6/2) redoximorphic depletions in the Bt1 horizon from 36-68 cm, aquic conditions in normal years, and an abrupt textural change with an absolute clay increase of 28.2 percent at the upper boundary of the argillic horizon met the criteria for Albaquic Paleudalfs. The particle-size control section from 36-86 cm averages 32.9 percent clay content and 15 percent or more particles of fine sand or coarser giving a particle-size class of fine-loamy. Mineralogy and cation-exchange capacity were not determined for this soil, but this soil is expected to be dominated by quartz in the sand and silt fraction and the mineralogy class is likely siliceous. The cation-exchange activity class is likely active given the general lack of indications of smectitic mineralogy in surrounding soils. Therefore the soil is classified as a fine-loamy, siliceous, active, thermic Albaquic Paleudalf and is not similar to any established soil series.

Endosaturation and Episaturation

Figure 26 shows the soil profiles of the T-4 site relative to elevation with special emphasis given to reduced matrix colors or gleyed horizons. One intermound pedon (7025) exhibits gleyed horizons (soil matrix colors of chroma 2 or less) indicative of saturation in normal years within 100 cm of the soil surface, while the other intermound pedon has redoximorphic depletions of chroma 2 or less; both are taxonomically identified by aquic subgroups. In these instances and in gleyed horizons found below a depth of 100 cm in other pedons at this site, the conditions are attributed to perching of water (episaturation) associated with increases in clay content throughout the pedons. Another indicator of water saturation is glossic horizons. The presence of glossic horizons in four of the five sampled pedons indicates that argillic horizons are being degraded by water movement. This also suggests that the perching of water followed by drying of the soil lead to the process of ferrolysis in many of these soils. Intermound

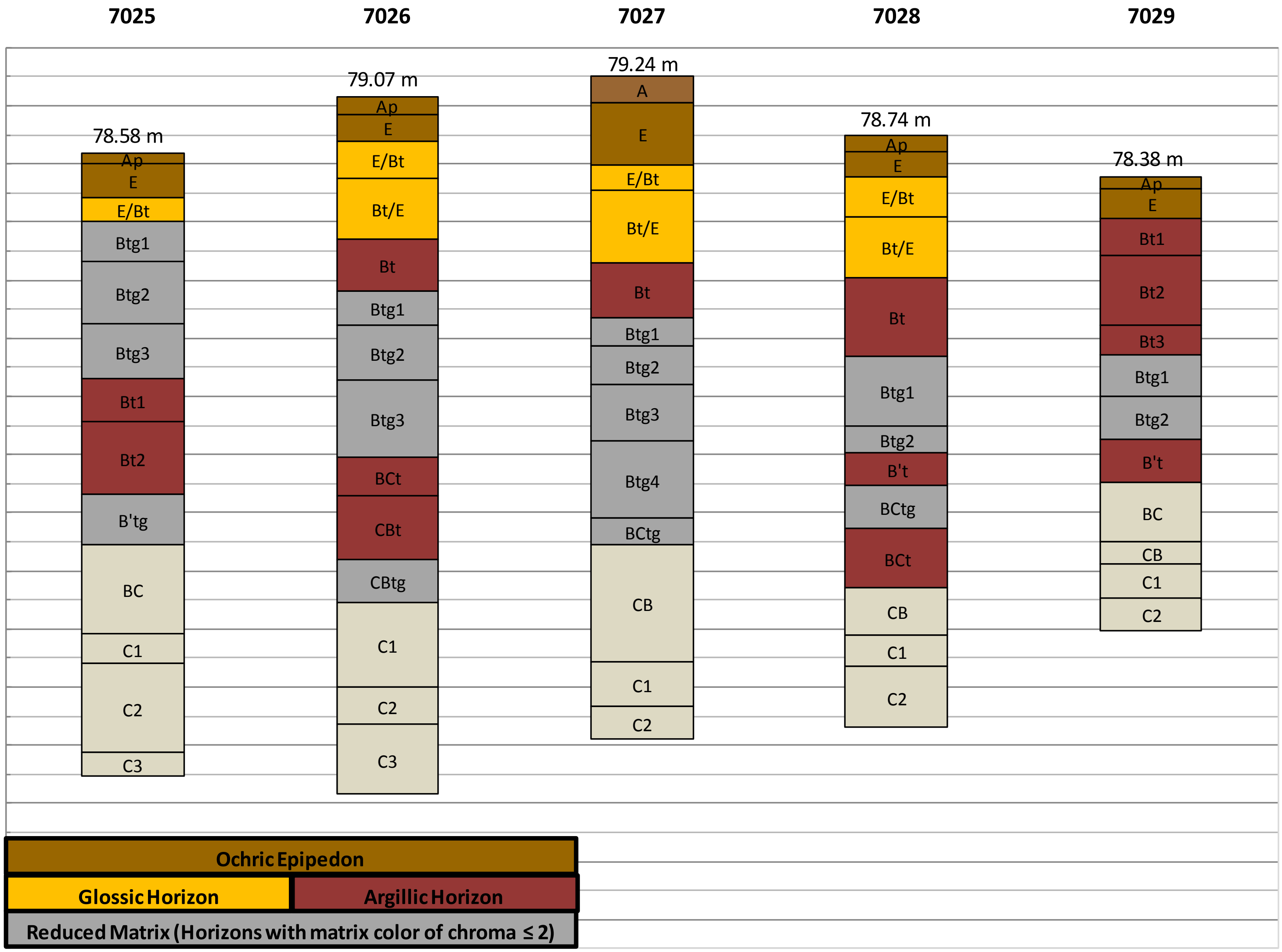


Fig. 26. Observed soil horizons by pedon relative at T-4 (Lake Leon Quad) Site. Vertical axis interval is 25 cm.

pedon 7029 has indications that a glossic horizon once existed which has degraded to the point that only the eluvial material in the E horizon is now prominent.

While precipitation may vary seasonally, the general trend of a percolative moisture regime in these soils allow for deep downward movement of water and subsurface flow downslope to Kinnon Creek as this site is near Kinnon Creek and the nick point of the T-4 terrace. The trend for downward water movement coupled with the relative age of the T-4 surface has formed a soil in which the soil pH is strongly acidic throughout the profile below the ochric epipedon and is buffered by aluminum. The leaching of any exchangeable bases continues to intensify the weathering of this very deep soil.

The glossic horizon in pedon 7025 may suggest episaturation in the past, and skeletans on the vertical faces of peds in the Btg1 horizon together with gleyed colors from 59-194 cm may indicate that episaturation occurs in the present. These gleyed colors are associated with a clay increase with the greatest clay bulge in the Btg1 horizon at 50.9 percent clay. The B'tg horizon from 293-336 cm is also associated with a clay increase, but this horizon may receive water from upward movement relative to an aquitard represented by the C2 horizon with a clay content of 61.0 percent.

The presence of a glossic horizon in pedon 7026 is indicative of possible episaturation in the past, and the increase in clay content at 123 cm together with the presence of many grayish brown (10YR 5/2) iron depletions suggests that water may perch in the Bt horizon today also. The clay content of the BCt horizon of 58.5 percent is expected to best serve as an aquitard in this pedon with water perching in the Btg1, Btg2, and Btg3 horizons.

Glossic horizon in pedon 7027 indicates episaturation in the past, while the increase in clay content at 160 cm together with the many light brownish gray (10YR 6/2) iron depletions in the Bt horizon reveal that water likely perches at this depth today. The BCtg horizon may serve as an aquitard, but it is possible that precipitation accumulated on the summit of the pimple mound generally moves laterally and may allow for a greater accumulation of clay in the C1 horizon of 7026 and the CB horizon of 7028 in the past. While these horizons may have been restrictive to water movement at the time of deposition, continued clay accumulation may have occurred with time. A slight increase in pH in the C2 horizon may signal a permanent water table below or may simply be a product of an aquitard to leaching present above this horizon.

The glossic horizon in pedon 7028 suggests episaturation in the past, and the clay increase of 25.9 percent at a depth of 123 cm together with a variegated matrix color of light brownish gray (10YR 6/2), red (2.5YR 4/6, and yellowish brown (10YR 5/4) may indicate that water perches within the Bt horizon today. The BCtg, BCt, and CB horizons below a depth of 301 cm serve as an aquitard to downward movement allowing much of the water that reaches this depth to move laterally and downslope to the nearby Kinnon Creek.

The presence of residual argillic material in the E horizon in pedon 7029 indicates episaturation in the past, and the clay increase of 28.2 percent at a depth of 36 cm together with the presence of light brownish gray (10YR 6/2) iron depletions may indicate that water perches within the Bt1 horizon today. The B’t, BC, and CB horizons below a depth of 226 cm serve as an aquitard to downward movement of water. This may be further supported by gleyed horizons from 153-226 cm in the Btg1 and Btg2 horizons and the lack of gleyed horizons below this aquitard.

Depositional Environment

The homogeneity of the soils of the T-4 Site (Lake Leon Quad) is due to the fluvial depositional environment of the past coupled with the time of formation of these soils. The T-4 surface has been correlated to the Lissie Formation by Nordt (1986) which would place this surface at an age in the hundreds of thousands of years (0.79 to 2.48 Ma) before the present (Blum and Aslan, 2006; Winker, 1982). While this surface alternatively might be correlated to a younger age, it is in either case, much older than the T-1 and T-2 levels.

At the time of deposition the paleoriver may have followed a general path as illustrated by the white line in Fig. 27. At this stage the paleoriver was etching into the much higher Eocene-age deposits. The black line illustrates a possible general trend for the return of the paleoriver to the western margin of the T-4 flood plain. Initial field observations found the sediments deep within pedons at this site to have been deposited in a low velocity environment enriched in silt and clay size particles. Fig. 28 and 29 show these finer sediments as alternating trends between a depositional environment rich in very fine sands and silts and an environment dominated by clays and silts. It is hypothesized that the meandering paleoriver deposited the sediments that were observed

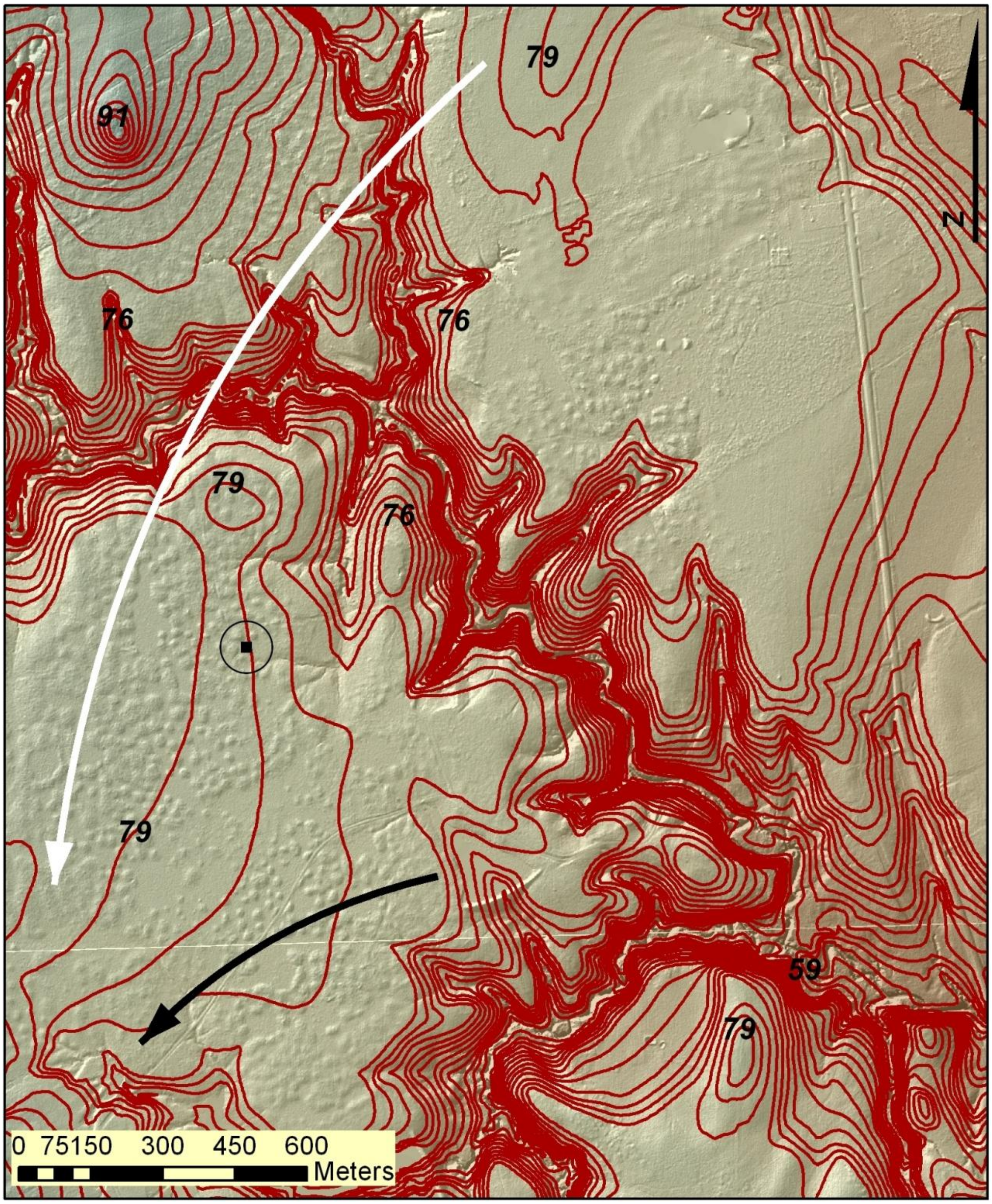


Fig. 27. Shaded relief image of the T-4 (Lake Leon Quad) Site at 1:15,000 scale. Contour lines (red) and sampling location (point within a circle) illustrate site with respect to surrounding landscape. The contour interval used is 1m with selected contours labeled. The white line indicates the general trend of the meandering paleoriver at the time of initial deposition and prior to a possible avulsion to the western margin of the T-4 floodplain. Black line indicates general trend of the meandering paleoriver upon its possible return to this portion of the T-4 floodplain.

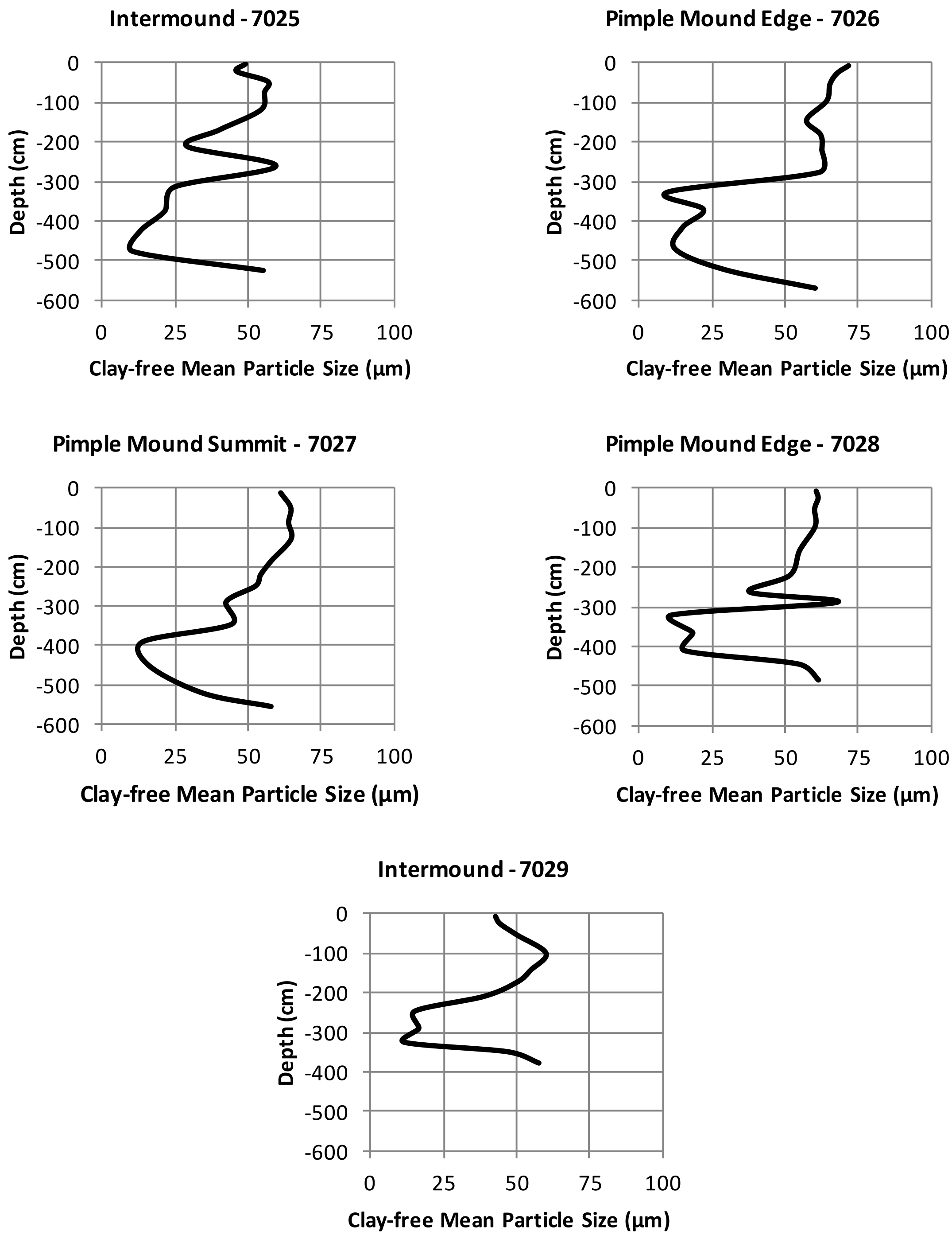


Fig. 28. Clay-free mean particle size (2-2000 µm fraction) with depth for the study soils at the T-4 Lake Leon Quad) Site. Pedons identified in relation to pimple mound and intermound positions.

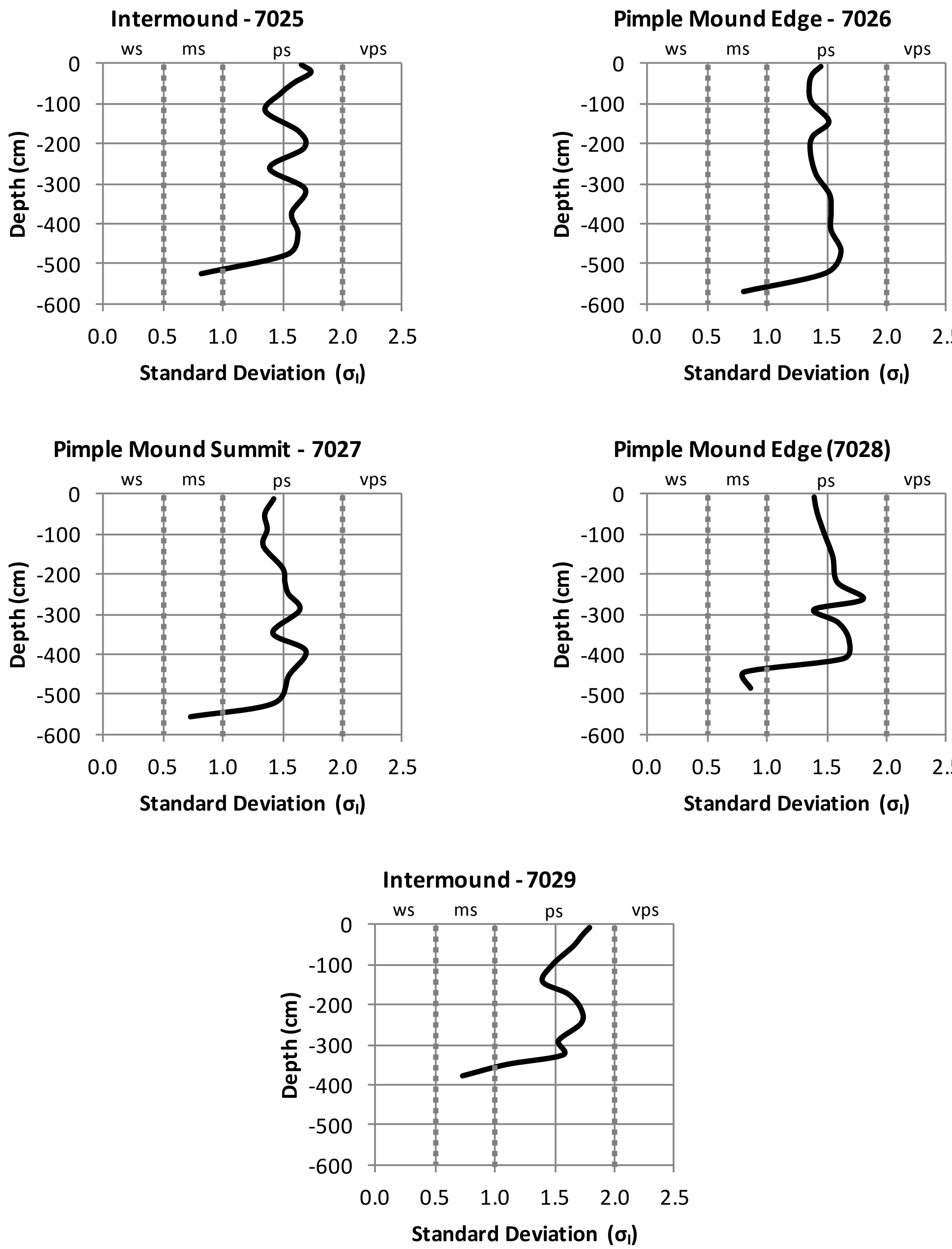


Fig. 29. Clay-free standard deviation of particle size distribution with depth for the study soils at the T-4 (Lake Leon Quad) Site. Letters along the top margin give verbal limits for standard deviation: ws, well sorted; ms, moderately sorted; ps, poorly sorted; vps, very poorly sorted. Pedons are identified in relation to pimple mound, and intermound positions.

at a depth of about 6 m as lateral accretion. This lateral accretion may have been followed shortly by a major avulsion to the eastern opposite margin of the T-4 floodplain, causing accumulation of clays and silts at the traverse site at a depth of about 3 to 6 m. At a later time the paleoriver may have returned to a position near the T-4 traverse site signaled by an east-west trend in the orientation of mounds (black line) as compared to the previous north-south trend (white line) as shown in Fig. 27. This change may have occurred while the river was moving across its floodplain (13.0 km wide in Fig. 30), or more likely, it signals the return of the river to this site after a major avulsion. In either case the paleoriver migrated extensively across its floodplain at this T-4 stage with coarser sediments deposited above and below a layer of much finer sediments.

While other sites illustrated a clear fining upward trend throughout the pedons in the clay-free fraction, the T-4 site did not. While changes in the fluvial deposition environment are the best explanation for this change in sediments, an alternate hypothesis for the presence of the coarser sediments at the surface would be these sediments are eolian. However, the poorly sorted nature of the sand and silt fraction as illustrated in Fig. 29 coupled with the predominance of very fine sands and silts throughout the upper 3 m of all sampled pedons at this site does not support an eolian origin. Further very fine sands and silts deposited by wind would be expected to drape the surface in a thick layer as is common in loess deposits rather than accumulate in the mound and ridge topography exhibited at this site. The intermound pedons 7025 and 7029 mimic the pimple mound pedons 7026-7028 in general trends and sand and silt size

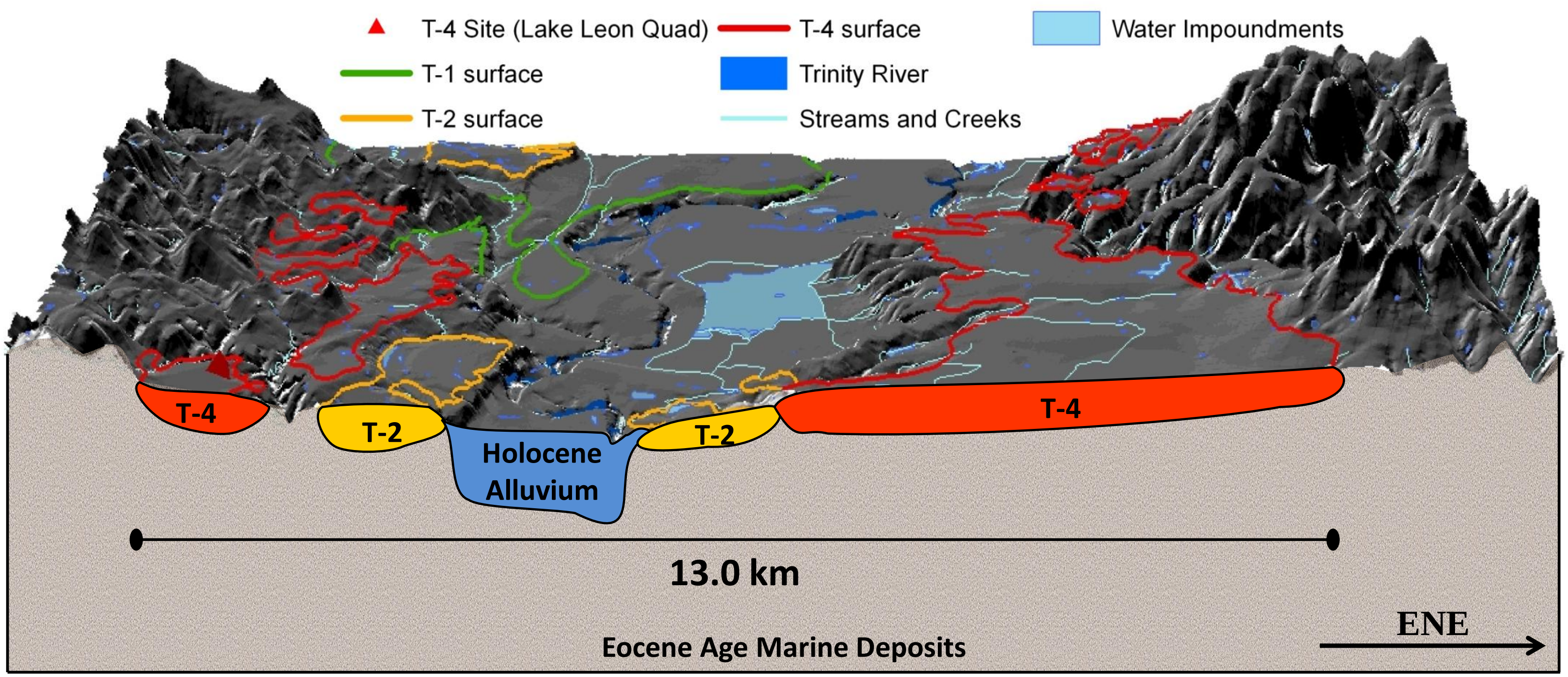


Fig. 30. Block diagram of T-4 (Lake Leon Quad) Site. Site is related to residuum and recent Holocene alluvium of the Trinity River Valley. Special emphasis is given to the width of the paleoriver floodplain (about 13.0 km) at the time of deposition. Vertical axis is exaggerated 25 times the actual elevation. Terrace deposits represent relative position of deposits and not actual depth.

particles deposited in the upper 2 m with a slight fining in the upper 50-100 cm of the intermound pedons which is expected as flood events in the past depositional environment would have accumulated silt-size particles in the lower intermounds.

Attributing these sediments to vertical accretion as overbank deposits better explains observations at this site. It is hypothesized that the relative proportion of very fine sands and silts to fine and medium sands further supports the hypothesis that the pimple mounds were originally deposited as accretion ridges on point bar deposits which were subsequently draped with layers of silts and clays followed by very fine sands and silts. These finer sediments are less susceptible to wind and water erosion which may explain heights of pimple mounds of the T-4 level commonly greater than 0.75 m. Considering the time these features have been exposed to erosive processes helps explain the prominent appearance of these features today. This also initiates the question of what were the relative heights of these features at the time of deposition.

The sampling site is located in a position in which sediments were deposited over a prolonged period of time as the river migrated in successive patterns across its flood plain. This allowed for deposition of overbank deposits enriched in very fine sands and silts during the period of deposition at this level with flood events at times depositing in alternating periods of finer and then coarser sediments as shown in Fig. 28. A slight fining trend is visible in the upper 100 cm of pedon 7027 (summit), 7025 (intermound), and 7029 (intermound). This trend is not visible in the pimple mound edges possibly due to the accumulation of erosional sediments from the summit in these positions. Concurrently, the intermounds may have received finer sediments deposited in suspension as the river ceased flooding this site possibly when the river was forming floodplains at lower elevations.

Zone of Lateral Accretion

Figure 31 shows the relationship of the sampled pimple mound to the underlying zone of lateral accretion. It should be noted that establishing a pattern for the pimple mounds and paleochannels proved to be difficult at this site, and likely the selected traverse across this pimple mound does not intersect a paleochannel. At this site a trend in which the underlying zone of lateral accretion mimics the modern day microtopography is not seen in the sampled pimple mound. This may be a product of the intense fluctuations in flooding pattern that may have occurred in the past, or it may be that the pimple mound was not traversed perpendicular to the river channel at the time of deposition, or it may be that the margins of the mound or possibly the preceding ridge were eroded away on the southern margin during a period of intense flooding as the of the paleoriver channel returned near this site while not disturbing the opposite margin of the mound to as great of an extent. Whatever the reason Fig. 31 does not show the expected relationship with regard to the soil surface and the top of the zone of lateral accretion.

The dynamic nature of rivers and fluvial environments make determining the depth at which vertical accretion began and lateral accretion ended a difficult task. The determination considered the clay-free mean particle size, total sand content, and sorting. The degree of sorting quantified by standard deviation of clay-free sediments was given

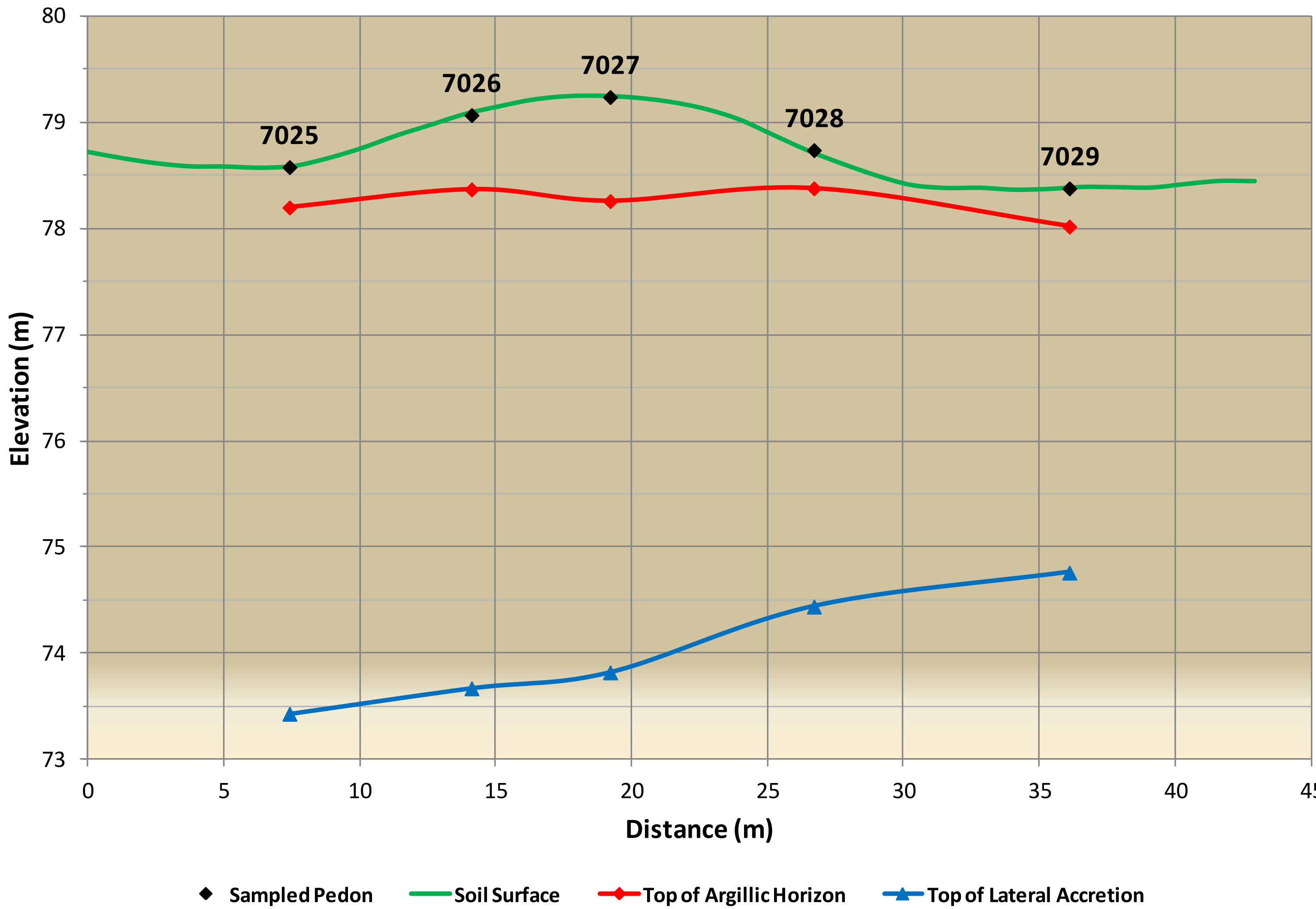


Fig. 31. Relation of lateral accretion to modern topography at T-4 (Lake Leon Quad) Site.

the greatest weight. The coarser sediments of the zone of lateral accretion were deposited in a higher energy (greater velocity) depositional environment than the overbank deposits of vertical accretion. Yet at this site even in this zone of coarser sediments, the mean particle size of the clay-free fraction does not approach the size of fine sand, but remains slightly coarser than coarse silt with a mean size of very fine sand (50-100 µm). Considering the similarity of sand and silt particle size throughout the profile, one must give added weight to the standard deviation or degree of sorting of the sediments to determine a distinct change in depositional environment attributed to the zone of lateral accretion. At this site poorly sorted sediments with a standard deviation greater than 1.0 are attributed to the zone of vertical accretion; while moderately sorted sediments with a standard deviation of less than 1.0 are assigned to the zone of lateral accretion.

The zone of lateral accretion in pedon 7025 begins at a depth of 515 cm and the top of the C3 horizon. Observations supporting this conclusion include an increase in total sand from 2.9 to 54.4 percent, a coarsening of the clay-free mean particle size from 10.8 to 55.3 µm, and a transition from poorly sorted sediments (standard deviation of 1.5) to moderately sorted sediments (standard deviation of 0.8).

Lateral accretion in pedon 7026 begins at a depth of 540 cm and the top of the C3 horizon. This corresponds to an increase in total sand from 21.8 to 61.2 percent, a coarsening of the clay-free mean particle size from 29.8 to 60.5 µm, and a transition from poorly sorted sediments (standard deviation of 1.5) to moderately sorted sediments (standard deviation of 0.8).

The zone of lateral accretion in pedon 7027 begins at a depth of 542 cm and the top of the C2 horizon. Support for this depth includes an increase in total sand from 30.5 to 59.0 percent, a coarsening of the clay-free mean particle size from 35.0 to 58.1 µm, and a transition from poorly sorted sediments (standard deviation of 1.4) to moderately sorted sediments (standard deviation of 0.7).

Lateral accretion in pedon 7028 begins at a depth of 430 cm which is the top of the C1 horizon. At that depth an increase in total sand from 7.6 to 55.0 percent along with transition from poorly sorted sediments (standard deviation of 1.6) to moderately sorted sediments (standard deviation of 0.8) occurs.

The zone of lateral accretion in pedon 7029 begins at a depth of 362 cm and the top of the C2 horizon. Data supporting this conclusion include an increase in total sand from 42.5 to 57.9 percent, a coarsening of the clay-free mean particle size from 47.3 to 57.9 µm, and a transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.7).

T-5 (Leona Quad) Site

Table 7 provides selected morphological, physical and chemical characteristics of the soils sampled at the T-5 Leona Site. Complete morphological descriptions are provided in Appendix A and complete physical and chemical data are given in Appendix B.

Table 7. Selected morphological, physical, and chemical characteristics of T-5 pimple mound and intermound pedons.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
				Glossaquic Paleudalf: Intermound Swale (7015)				
Ap	0-19	52.0	39.8	8.2	FSL	10YR 5/2	2COSBK	6.6
Bt/E	19-35	40.0	31.8	28.2	CL	10YR 5/4	2MSBK	5.6
Bt1	35-59	39.6	26.8	33.6	CL	10YR 5/4	2MABK	4.9
Bt2	59-91	40.3	28.5	31.2	CL	10YR 5/4	2COABK	5.6
Bt3	91-113	40.3	25.1	34.6	CL	10YR 5/4	2MABK	6.5
Bt4	113-140	41.1	27.7	31.2	CL	10YR 5/4	2MABK	6.9
Btg	140-178	42.8	23.6	33.6	CL	10YR 7/2	2COABK	6.7
Btv	178-220	55.3	19.1	25.6	SCL	10YR 5/6	1COABK	6.4
BCtg	220-260	58.5	20.6	20.9	SCL	2.5Y 7/2	1COSBK	6.3
CB	260-280	62.4	18.8	18.8	FSL	10YR 6/3	1COSBK	6.7
				Glossaquic Paleudalf: Edge of pimple mound (7016)				
Ap	0-15	65.6	30.0	4.4	VFSL	10YR 4/3	1MSBK	7.0
E1	15-38	64.6	29.2	6.2	VFSL	10YR 6/4	1MSBK	7.0
E2	38-68	60.4	30.0	9.6	FSL	10YR 6/4	1MSBK	5.3
Bt/E	68-101	47.7	28.4	23.9	L	7.5YR 5/6	2MSBK	4.4
Bt1	101-118	34.4	19.4	46.2	C	7.5YR 5/6	2MABK	4.3
Bt2	118-149	33.0	22.9	44.1	C	10YR 6/6	2MABK	4.5
Bt3	149-169	36.8	24.4	38.8	CL	10YR 6/6	2MABK	4.8
Bt4	169-189	41.3	24.4	34.3	CL	10YR 5/6	2MABK	5.0
Bt5	189-208	46.2	22.2	31.6	SCL	7.5YR 5/4	2MABK	5.1
Btv1	208-243	59.2	16.7	24.1	SCL	10YR 6/6	2MABK	5.6
Btv2	243-263	63.2	16.9	19.9	FSL	2.5YR 5/6	2MABK	6.4
B't	263-285	66.2	15.6	18.2	FSL	10YR 5/6	1MSBK	6.5
BC	285-320	82.8	3.1	14.1	FSL	7.5YR 5/8	1COSBK	6.7
CB	320-363	78.5	7.4	14.1	FSL	7.5YR 5/6	1COSBK	6.7
C1	363-399	88.6	2.7	8.7	LFS	7.5YR 5/6	0MA	6.4
C2	399-432	91.5	1.5	7	FS	10YR 6/6	0MA	6.6
				Glossic Paleudalf: Summit of pimple mound (7017)				
Ap	0-18	66.6	29.1	4.3	VFSL	10YR 4/3	1MSBK	7.1
E1	18-45	66.4	28.8	4.8	VFSL	10YR 5/4	1MSBK	7.4
E2	45-77	65.5	27.6	6.9	VFSL	7.5YR 6/6	1MSBK	7.2
E/Bt	77-111	56.1	24.8	19.1	FSL	10YR 5/6	2MSBK	4.4
Bt/E	111-143	52.6	26.7	20.7	SCL	10YR 5/4	2MSBK	4.6
Bt1	143-160	42.6	20.4	37.0	CL	10YR 5/6	2MABK	4.8
Bt2	160-183	34.7	18.8	46.5	C	10YR 5/4	2MABK	4.6
Bt3	183-217	40.0	22.1	37.9	CL	2.5Y 5/3	2MABK	4.8
Bt4	217-238	46.6	21.2	32.2	SCL	7.5YR 6/6	2MABK	4.9
Btv1	238-258	50.6	19.5	29.9	SCL	7.5YR 6/6	2MABK	5.0
Btv2	258-284	61.2	16.7	22.1	SCL	10YR 6/6	1MSBK	5.4
BCt1	284-313	67.3	12.6	20.1	SCL	10YR 6/4	1MSBK	5.7
BCt2	313-353	77.1	7.1	15.8	FSL	10YR 5/6	1COSBK	5.9
C1	353-393	80.2	4.6	15.2	FSL	7.5YR 5/6	0MA	5.9
C2	393-432	81.1	4.1	14.8	FSL	10YR 6/4	0MA	5.7
Cg	432-500	81.6	6.5	11.9	FSL	10YR 7/2	0MA	5.8

Table 7 Continued.

Horizon	Depth	Sand	Silt	Clay	Texture ‡	Matrix color ††	Structure §	pH (H_2O)
	cm	------------%------------				(moist)		1:1
				Glossic Paleudalf: Edge of pimple mound (7018)				
Ap	0-17	66.8	28.7	4.5	VFSL	10YR 4/3	1MSBK / 2MGR	6.6
E1	17-38	65.3	28.9	5.8	VFSL	10YR 5/4	1MSBK	7.2
E2	38-59	64.8	27.3	7.9	VFSL	10YR 6/6	1MSBK	7.3
E/Bt	59-78	61.6	27.8	10.6	VFSL	10YR 6/4	2MSBK	5.6
Bt/E	78-103	59.1	25.2	15.7	FSL	10YR 5/6	1MSBK	4.4
Btg	103-133	45.8	23.7	30.5	SCL	10YR 6/2	2MABK	4.6
Bt1	133-149	41.1	19.9	39.0	CL	10YR 5/6	2MABK	4.8
Bt2	149-183	39.5	20.1	40.4	C	10YR 6/4	2MABK	5.0
Bt3	183-208	42.3	24.2	33.5	CL	10YR 6/3	2MABK	5.3
Bt4	208-244	43.4	25.3	31.3	CL	10YR 6/3	2MABK	5.7
B'tg	244-284	57.5	17.4	25.1	SCL	10YR 6/2	1COSBK	6.4
BC	284-317	81.6	5.5	12.9	FSL	10YR 5/8	1COSBK	6.6
CB	317-360	83.4	3.2	13.4	LFS	10YR 5/6	1COSBK	6.4
C1	360-399	81.0	5.8	13.2	FSL	7.5YR 5/4	0MA	6.2
C2	399-475	86.8	2.7	10.5	LFS	7.5YR 6/6	0MA	6.0
				Glossic Paleudalf: Intermound Swale (7019)				
Ap	0-20	36.9	40.1	23.0	L	10YR 5/3	1MSBK	4.9
E/Bt	20-46	34.7	39.7	25.6	L	10YR 6/3	2MSBK	4.5
Bt1	46-72	29.2	35.6	35.2	CL	10YR 5/3	2MABK	4.5
Bt2	72-113	30.0	34.6	35.4	CL	10YR 6/3	2MABK	4.7
Bt3	113-136	33.6	31.0	35.4	CL	10YR 5/4	2MABK	5.9
Bt4	136-170	34.7	31.9	33.4	CL	10YR 5/4	2MABK	7.1
Bt5	170-206	41.2	26.2	32.6	CL	10YR 6/4	2MABK	7.4
Btg1	206-251	51.0	20.5	28.5	SCL	10YR 7/2	1COSBK	7.5
Btg2	251-270	68.9	16.3	14.8	FSL	10YR 6/2	1COSBK	7.4
BC	270-298	84.6	3.5	11.9	LFS	7.5YR 5/8	1COSBK	7.3
CB	298-321	85.0	1.9	13.1	LFS	10YR 5/8	1COSBK	7.3
C1	321-352	92.4	0.6	7.0	FS	2.5YR 5/8	0MA	7.2
C2	352-406	88.9	2.9	8.2	LFS	7.5YR 5/6	0MA	7.2
C3	406-443	15.0	41.7	43.3	SiC	10YR 5/6	0MA	7.3
C4	443-460	68.9	12.6	18.5	FSL	10YR 6/6	0MA	7.3

† Horizon designation and coding according to Schoeneberger et al. (2002).

‡ Soil texture: C, clay; CL, clay loam; FS, fine sand; FSL, fine sandy loam; L, loam; LFS, loamy fine sand; SCL, sandy clay loam; SiC, silty clay; VFSL, very fine sandy loam.

†† Soil matrix color identified by Munsell ® color notation.

§ Soil structure: Grade - 0 , structureless; 1, weak; 2, moderate; Size - F, fine; M, medium; CO, coarse; Type - ABK, angular blocky; GR, granular; MA, massive; SBK, subangular blocky; /, parting to.

Morphology and Classification of Soils

All sampled pedons at this site (7015-7019) have an ochric epipedon and an argillic horizon with a base saturation estimated from pH to be greater than 35 percent at a depth of 180-200 cm which meets the criteria for Alfisols and a soil moisture regime of udic which meets the requirements for Udalfs. However, the degree of pedogenesis, solum thickness, and weathering within the pimple mounds of the older T-5 level may have been sufficient for leaching of exchangeable bases to give less than 35 percent base saturation at a depth of 180-200 cm. If so, then soils at this site would meet the criteria for Ultisols and Udults. Base saturation analysis and CEC were not completed on these pedons, but would provide data for understanding soil development and weathering of clay minerals over time.

The soil temperature regime for the study site is thermic with a mean annual air temperature of about 18.6° C. Soils sampled at this site do not have a clay decrease of 20 percent or more relative from the maximum clay content within 150 cm of the soil surface, and contain many coarse redoximorphic concentrations with a hue of 5YR or redder or chroma of 6 or more in one or more subhorizons within 2 m of the soil surface which meet the criteria for Paleudalfs. This site differed from other sites with homogenous soils encountered across the traverse of a pimple mound, and only one great group and two subgroup classifications identified among the five sampled pedons within a linear distance of 40.8 meters. Subgroups identified include Glossaquic

Paleudalfs and Glossic Paleudalfs. Figure 32 shows the orientation of the five sampled pedons with respect to microtopography.

The intermound swale pedon (7015) has an ochric epipedon to a depth of 19 cm, a glossic horizon from 19-35 cm, an argillic horizon from 19-260 cm, lenticular fragments of shale or organic material from 91-140 cm, skeletans or sand coats from 113-220 cm, plinthite from 178-220 cm, and redoximorphic features throughout. The glossic horizon indicates that clay is eluviating from the upper portion of the argillic horizon and possibly accumulating within the Bt1 horizon, while the skeletans indicate clay movement and degradation of the lower argillic horizon and possible accumulation within the lower portion of the Btg horizon. The plinthite observed is not a major factor in soil development, but is an indicator of the weathering and age of this soil, the degree of iron segregation and the depth of pedogenesis. The fragments encountered from 91-140 cm may be unweathered shale deposited as overbank deposits during the downcutting of the adjacent intermound channel position into the underlying Eocene age deposits. Soil structure is subangular blocky at the surface and changes to angular blocky in the upper portion of the solum before returning to subangular blocky in the BCtg horizon. The underlying material was not sampled due to a restrictive clay layer encountered at a depth of 280 cm through which a core could not be obtained with the dry conditions. This layer may be similar to the silty clay textured C3 horizon in the opposite intermound swale pedon (7019). The presence of redoximorphic depletions with chroma of 2 or less in the Bt1 horizon within 75 cm of the surface, aquic conditions in normal years, and a glossic horizon meet the criteria for Glossaquic Paleudalfs. The

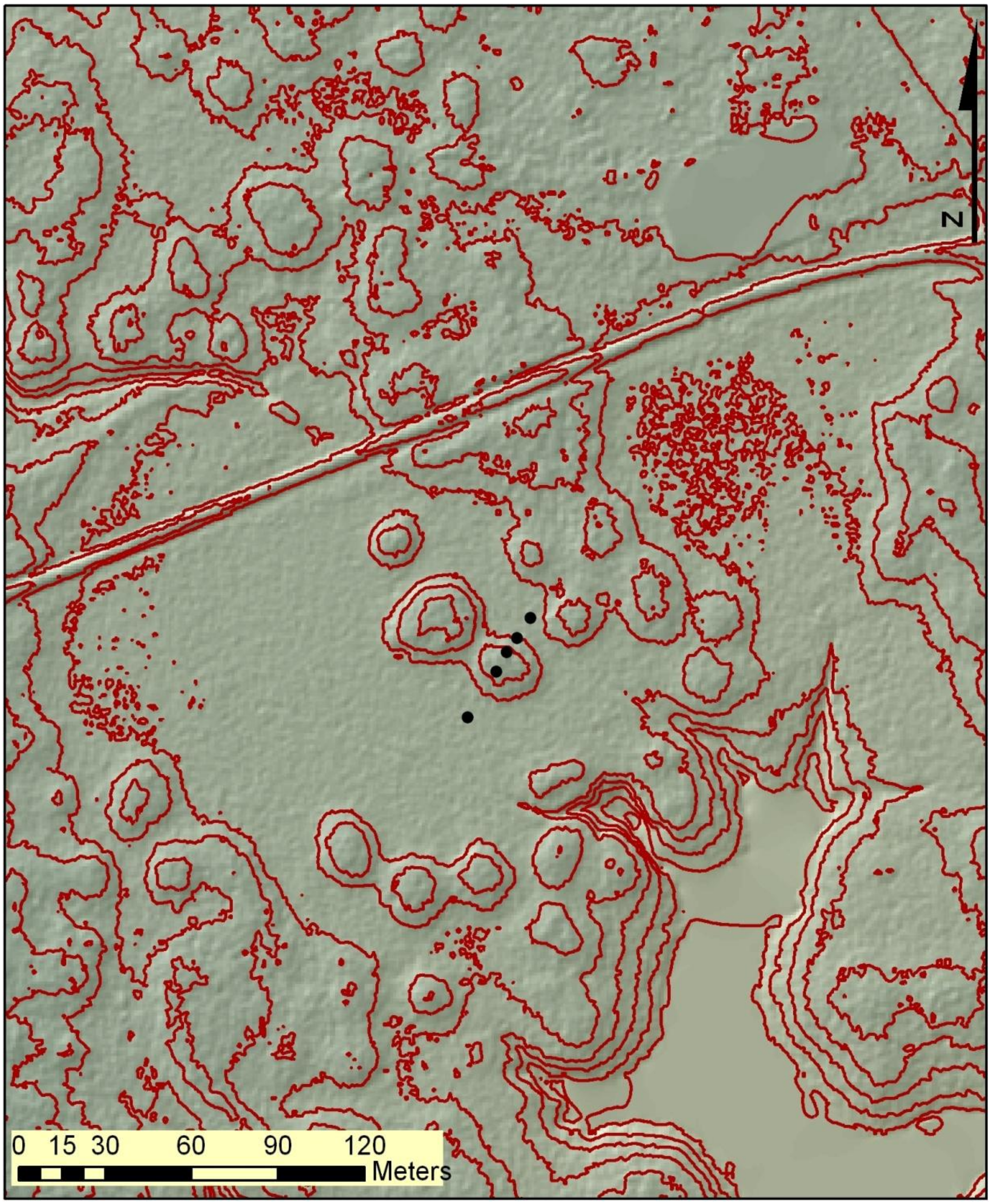


Fig. 32. Shaded relief image of T-5 (Leona Quad) Site at 1:2,500 scale. Contour lines (red) and locations of the five sampled pedons (black circles) are indicated. Contour interval is 30 cm.

particle-size control section from 19-69 cm averages 31.4 percent clay content and more than 15 percent of the particles are fine sand or coarser, so the particle-size class is fine-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction giving a mineralogy class of siliceous, and the cation-exchange activity class is likely active or semiactive given the lack of indications for smectitic mineralogy in surrounding soils that contain higher clay content. The soil is classified as a fine-loamy, siliceous, semiactive, thermic Glossaquic Paleudalf and is similar to the Freestone soil series which is typically found on Pleistocene-age stream terraces or terrace remnants in the western part of the Southern Coastal Plains of eastern Texas. The typical pedon for Freestone is found near Palestine in Anderson County, Texas.

The pimple mound edge pedon (7016) has an ochric epipedon to a depth of 68 cm, a glossic horizon from 68-101 cm, an argillic horizon from 68-285 cm, plinthite nodules from 208-263 cm, and redoximorphic features throughout. The glossic horizon indicates that clay is eluviating from the upper portion of the argillic horizon and accumulating within the Bt1 horizon. The plinthite nodules may indicate redistribution of iron and accumulation possibly associated with a fluctuating water table from 208-263 cm. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the B’t horizon at a depth of 263 cm. The underlying material is stuctureless massive loamy fine sand from a depth of 363-399 cm, and structureless massive fine sand to a depth of 432 cm. The soil was not sampled from a depth of 432-472 cm, but a restrictive clay layer similar to the layer found in pedon

7015 was encountered at a depth of 472 cm. This restrictive layer is light gray (10YR 7/2) in color with a field texture of clay.

The presence of redoximorphic depletions with chroma of 2 or less in the Bt/E horizon within 75 cm of the surface, aquic conditions in normal years, and a glossic horizon meet the criteria for Glossaquic Paleudalfs. The particle-size control section from 68-118 cm averages 31.5 percent clay content and more than 15 percent of the particles are fine sand or coarser, so the particle-size class is fine-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. However, this soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is siliceous, and the cation-exchange activity class is active or semiactive given the lack of indications for smectitic mineralogy. Therefore, the soil is classified as a fine-loamy, siliceous, semiactive, thermic Glossaquic Paleudalf and is similar to the Freestone soil series which is typically found on Pleistocene age stream terraces or terrace remnants in the western part of the Southern Coastal Plains of eastern Texas. The typical pedon for Freestone is found near Palestine in Anderson County, Texas.

The pimple mound summit pedon (7017) has an ochric epipedon to a depth of 77 cm, a glossic horizon from 77-143 cm, an argillic horizon from 77-353 cm, skeletans from 111-143 cm, plinthite nodules from 238-284 cm, and redoximorphic features throughout the pedon below a depth of 77 cm. The glossic horizon and skeletans indicate that clay is eluviating from the upper portion of the argillic horizon and accumulating within the Bt1 and Bt2 horizons. Soil structure changes from subangular to angular blocky in the upper argillic horizon before returning to subangular blocky in the Btv2 horizon at a depth of 258 cm. The underlying C material is stratified stuctureless massive fine sandy loam from a depth of 353 to the depth of sampling at 500 cm. The presence of a glossic horizon meets the criteria for Glossic Paleudalfs. The particle-size control section from 77-127 cm averaged 19.6 percent clay content by weight so the particle-size class is fine-loamy. Mineralogy and cation-exchange capacity were not determined for this soil, but this soil is expected to be dominated by quartz in the sand and silt fraction so is considered siliceous. The cation-exchange activity class is active or semiactive given the lack of indications for smectitic mineralogy. The soil is classified as a fine-loamy, siliceous, semiactive, thermic Glossic Paleudalf and is similar to the Gallime soil series which is typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

The pimple mound edge pedon (7018) has an ochric epipedon to a depth of 59 cm, a glossic horizon from 59 to 103 cm, an argillic horizon from 78-284 cm, and redoximorphic features throughout the profile. The glossic horizon indicates that clay is eluviating from the upper portion of the argillic horizon and accumulating within the Btg horizon. Redoximorphic features include oxidized iron concentrations which approach classification as plinthite nodules, also present are ironstone nodules. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the B’tg horizon at a depth of 244 cm. The underlying C material is stuctureless massive fine sandy loam from a depth of 360 to 399 cm, and structureless massive loamy fine sand to the depth of sampling at 475 cm. The presence of a glossic horizon meets the criteria for Glossic Paleudalfs. The particle-size control section from 78-128 cm averaged 23.1 percent clay content by weight so the particle-size class is fine-loamy. Mineralogy and cation-exchange capacity were not determined for this soil. This soil is expected to be dominated by quartz in the sand and silt fraction so the mineralogy class is deemed siliceous, and the cation-exchange activity class is active or semiactive given the lack of indications for smectitic mineralogy. The soil is classified as a fine-loamy, siliceous, semiactive, thermic Glossic Paleudalf and is similar to the Gallime soil series which is typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

The intermound swale pedon (7019) has an ochric epipedon to a depth of 20 cm, a glossic horizon from 20-46 cm, an argillic horizon from 46-270 cm, skeletans from 46-72 cm, and redoximorphic features throughout. Soil structure changes from subangular to angular blocky in the argillic horizon before returning to subangular blocky in the Btg1 horizon at a depth of 206 cm. The underlying C material is stuctureless massive fine sand from a depth of 321-352 cm, structureless massive loamy fine sand from a depth of 352-406 cm, structureless massive silty clay from a depth of 406-443 cm, and structureless massive fine sandy loam to the depth of sampling at 460 cm. The presence of a glossic horizon met the criteria for Glossic Paleudalfs. The particle-size control section from 46-96 cm averages 35.3 percent clay content by weight, therefore the particle-size class is fine. Mineralogy and cation-exchange capacity were not determined for this soil. The absence of smectitic features in this pedon indicates intense weathering and acidification that may have occurred due to ferrolysis in the glossic horizon and upper argillic horizon. The mineralogy class is considered mixed, and the cation-exchange activity class is likely semiactive. Therefore, the soil is classified as a fine, mixed, semiactive, thermic Glossic Paleudalf and is similar to the Gallime soil series which is typically found on Pleistocene-age terraces of the Southern Coastal Plains of eastern Texas. The typical pedon for Gallime is found near Murchison in Henderson County, Texas.

Endosaturation and Episaturation

Figure 33 details the T-5 soil profiles relative to elevation with special emphasis on reduced matrix colors or gleyed horizons. Pedons 7015 and 7016 exhibited aquic conditions within 75 cm of the soil surface as represented by redoximorphic depletions of chroma less than 2. The opposite intermound and pimple mound edge soils (7018 and 7019) did not show an aquic condition within 75 cm of the soil surface; however, these features were observed within 2 m of the surface. This may be related to the landscape position of the broad intermound swale relative to the narrow intermound swale. The broad intermound swale represented by pedon 7019 may receives less water from surface runoff while the narrow intermound swale represented by pedon 7015 may perch more water at times due to a slight difference in its position relative to adjacent pimple mounds. These adjacent convex mounds may direct surface and subsurface flow to this pedon. Pedon 7019 however may receive greater subsurface flow from the T-5 terrace and adjacent residual and colluvial upland deposits. Surface and subsurface flow from

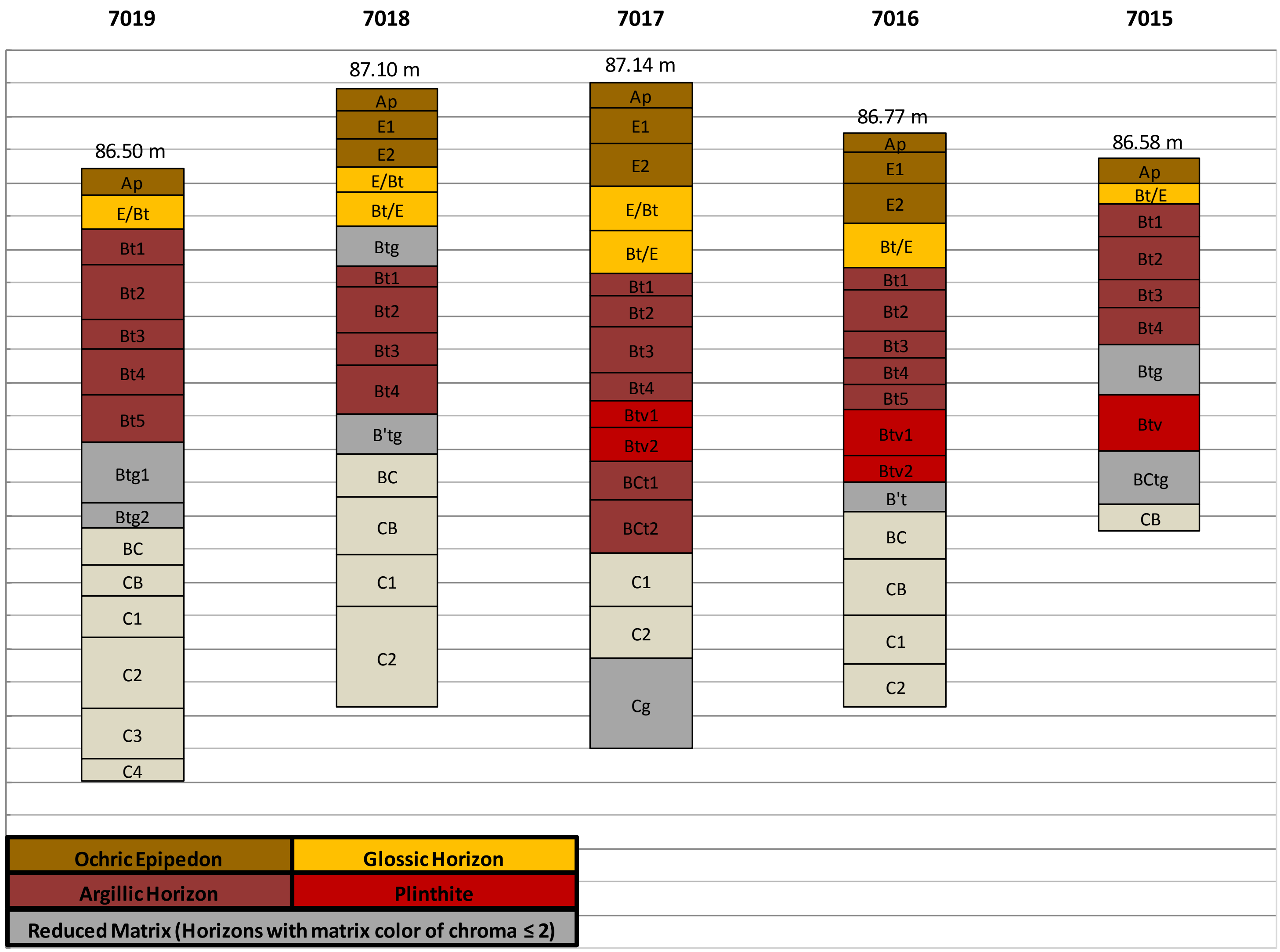


Fig. 33. Observed soil horizons by pedon relative to elevation at T-5 (Leona Quad) Site. Vertical axis interval is 25 cm.

higher landscape positions may also contain greater quantities of exchangeable bases leached from the overlying soils and accumulated in the subsurface of the broad intermound where pH values exceed pH 7 below 136 cm and gleyed horizons exist from 206-270 cm.

The stratified bedding planes of finer sediments underlying this site should provide sufficient impediment to downward water movement in most years for a groundwater table to exist below a depth of 2 to 4 m. At the time of sampling due to extreme drought conditions this occluded aquifer was not observed. The aquifer may be situated seasonally above the restrictive layer observed in pedons 7015 and 7016, and the silty clay textured C3 horizon sampled in pedon 7019. Evidence suggesting the presence of this seasonal fluctuating groundwater table is the presence of plinthite and petroplinthite in sampled pedons as well as the gleyed colors observed in the Cg horizon of the pimple mound summit (7017).

The presence of glossic horizons in the five sampled pedons at this site indicates that argillic horizons are being degraded by water movement. This suggests that the perching of water followed by drying of the soil may lead to the process of ferrolysis in many of these soils. In each glossic horizon, pH values are sufficiently low (< 5.6) to support ferrolysis despite the addition of lime in recent years. Liming explains the pH values observed in the epipedons of all sampled soils except pedon 7019.

While precipitation may vary seasonally, the general trend of a percolative moisture regime at this site allows for deep downward movement of water and subsurface flow down slope to the adjacent impoundment and Keechi Creek. This is attributed to the site position relative to Keechi Creek and relative to the nick point of the T-5 terrace. This trend for downward water movement coupled with the relative age of the T-5 surface has formed a soil in which the soil pH is dominantly less than 5.5 below the ochric epipedon and buffered by aluminum, and in which the downward leaching of exchangeable bases continues to intensify the weathering of this very deep soil especially in the 1-2 m section.

The presence of a glossic horizon with light brownish gray (10YR 6/2) eluvial materials and an abrupt textural change above the glossic horizon in pedon 7015 suggests perched water at a depth of 19-35 cm. Also, the presence of skeletans from 91-140 cm above a clay increase and gleyed Btg horizon also indicate that water perches at 140-178 cm. The reduced matrix colors associated with the BCtg horizon from 220-260 cm may be associated with an occluded aquifer above the restrictive clay layer present at 280 cm.

The presence of a glossic horizon with light brownish gray (10YR 6/2) iron depletions, and an abrupt textural change are indicative of the perching of water in pedon 7016 at a depth of 68 cm. The presence of plinthite nodules from 208-263 cm may be attributed to a seasonal fluctuating water table with sufficient iron oxides present in the soil. The water table is associated with the restrictive layer encountered at 472 cm.

The glossic horizon, grayish brown (10YR 5/2) iron depletions in the Bt1 horizon, and an abrupt textural change at 77 cm in pedon 7017 suggest episaturation below a depth of 77 cm. The presence of plinthite nodules from 238-284 cm may be attributed to a seasonal fluctuating water table with sufficient iron oxides present in the soil. While the gleying of the Cg horizon from 432-500 cm results from a restrictive layer below 5 m.

The glossic horizon in pedon 7018 suggests episaturation, and the clay increase of 14.2% at a depth of 103 cm together with a light brownish gray (10YR 6/2) matrix color in the Btg horizon confirm that water perches at this depth seasonally. The B’tg horizon may be indicative of a fluctuating water table to a depth including this gleyed horizon and may be a product of the textural change relative to coarser textured horizons below and the potential for periods of saturation due to the matric potential of the B’tg horizon with a clay content of 25.1 percent relative to the BC horizon with a clay content of 12.9 percent. As water moves downward from leaching or upward from water table fluctuations, the B’tg horizon will retain saturated conditions while the BC horizon will not have sufficient water retention for saturation during most years.

The presence of a glossic horizon in pedon 7019 suggests episaturation, and the clay increase of 9.4% at a depth of 46 cm together with very pale brown (10YR 7/3) skeletans in the Bt1 horizon are further evidence that water perches at this depth seasonally. The Btg1 and Btg2 horizons may be indicative of a fluctuating water table to a depth including these gleyed horizons, and they may also result from periods of saturation due to the contrast in matric potential of the clayey horizons relative to the underlying loamy fine sand and fine sand. As water moves downward from leaching or upward from water table fluctuations, the Btg1 and Btg2 horizons will retain saturated conditions while the BC horizon and underlying sediments will not have sufficient water retention for saturation, except seasonally.

Depositional Environment

The homogeneity of the soils of the T-5 (Leona Quad) Site is attributed in part to the fluvial depositional environment of the past and the homogeneity of sediments in the paleoriver watershed, but these soils are largely a product of their age. At the time of deposition the paleoriver was constrained by a river valley roughly 2,500 m across at a position represented by the Pleistocene-age paleoriver sediments on opposite sides of the modern Keechi Creek (represented by Holocene Alluvium) illustrated in Fig. 34. The Eocene-age sediments of the uplands surrounding this position are derived from the Sparta and Weches geologic formations. While the higher terrace surface and underlying sediments were not observed during this study, the presence of eroded pimple mounds observed from LiDAR derived hillshade models and the gently sloping surface relative to the strongly sloping surface of the adjacent uplands signals that these are remnant higher terraces of the paleoriver which formed the surface of the T-5 sampling site. This also correlates with soil mapping on one of the nearby high terraces in an area mapped as the Rader soil series, a soil commonly situated in stream terrace positions (Neitsch et al., 1989).

Prior to down cutting, the paleoriver may have been stationary within the broad intermound swale and limited by a restrictive bedrock layer below for an extended period. This position is represented by pedon 7019 in Fig. 32. This might explain the large size of the sampled pimple mound and adjacent mound to the north on this old surface despite years of erosion. Yet once the paleoriver moved to a position near the modern flood plain of the Keechi Creek, the river was confined to a narrow river valley

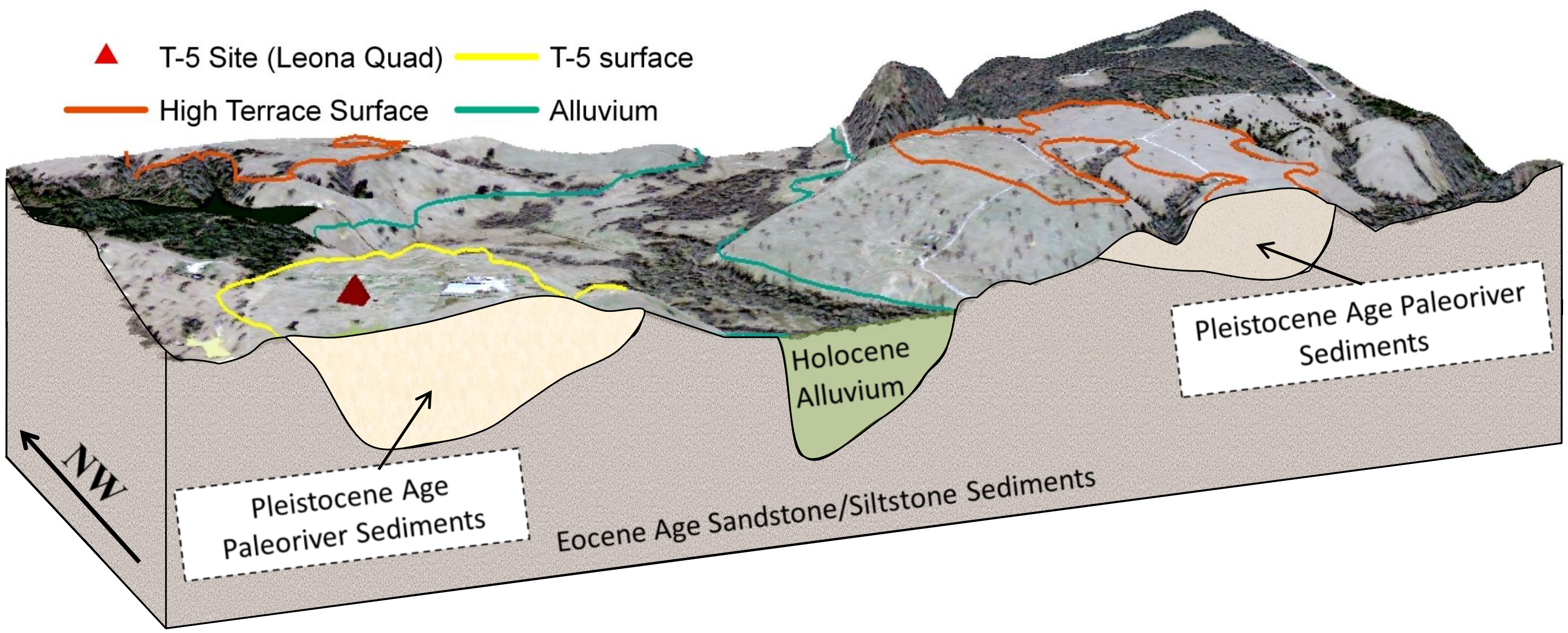


Fig. 34. Block diagram of T-5 (Leona Quad) Site. Site is in relation to residuum and recent Holocene alluvium of the Keechi Creek watershed. Higher terrace surfaces (elevation 90-95 m) exhibit a limited extent of eroded pimple mounds on a gently sloping surface relative to the extensive pimple mounds of the T-5 surface (elevation 86-87 m). Keechi Creek is represented by the position of the Holocene Alluvium deposits.

which explains the absence of lower level terraces and their corresponding pimple mounds and ridges at this site which is separated from the modern Trinity River floodplain by about 16.5 km in a direct east-west direction and about 19 km along northwest-southeast path of the modern Keechi Creek floodplain.

The sampling site is located in a position in which sediments were deposited over a prolonged period of time as the river moved across its flood plain to the southwest with this surface proposed as a possible final position of the river prior to down cutting into the T-4 level which is now nonexistent. The narrow limits of this river valley however would have allowed for flood events from the then T-4 and T-3 surfaces to have potentially draped this surface with clay, silt, and sand sized particles over a prolonged period of time which gave rise to the very deep soil in existence today.

The clay-free mean particle size by horizon is shown in Fig. 35. All pedons excluding 7015 had a mean particle size of 125 µm or coarser in the base sediments, with fining upward to a mean particle size of less than 75 µm. The intermound swales showed the finest mean particle size of < 50 µm. The C3 and C4 horizons below a depth of 406 cm in pedon 7019 may be representative of over bank deposits from the paleoriver prior to moving into a position near the T-5 site. Alternatively the C3 and C4 horizons in pedon 7019 may represent weathered Eocene age sediments at the base of the paleoriver channel. It should also be considered that many of the sediments overlying this layer have been eroded during the time of development of this soil with roughly 4 m exposed today. The degree of sorting of sediments based on the standard deviation of the clay-free particle sizes, trend toward moderate sorting at the deeper

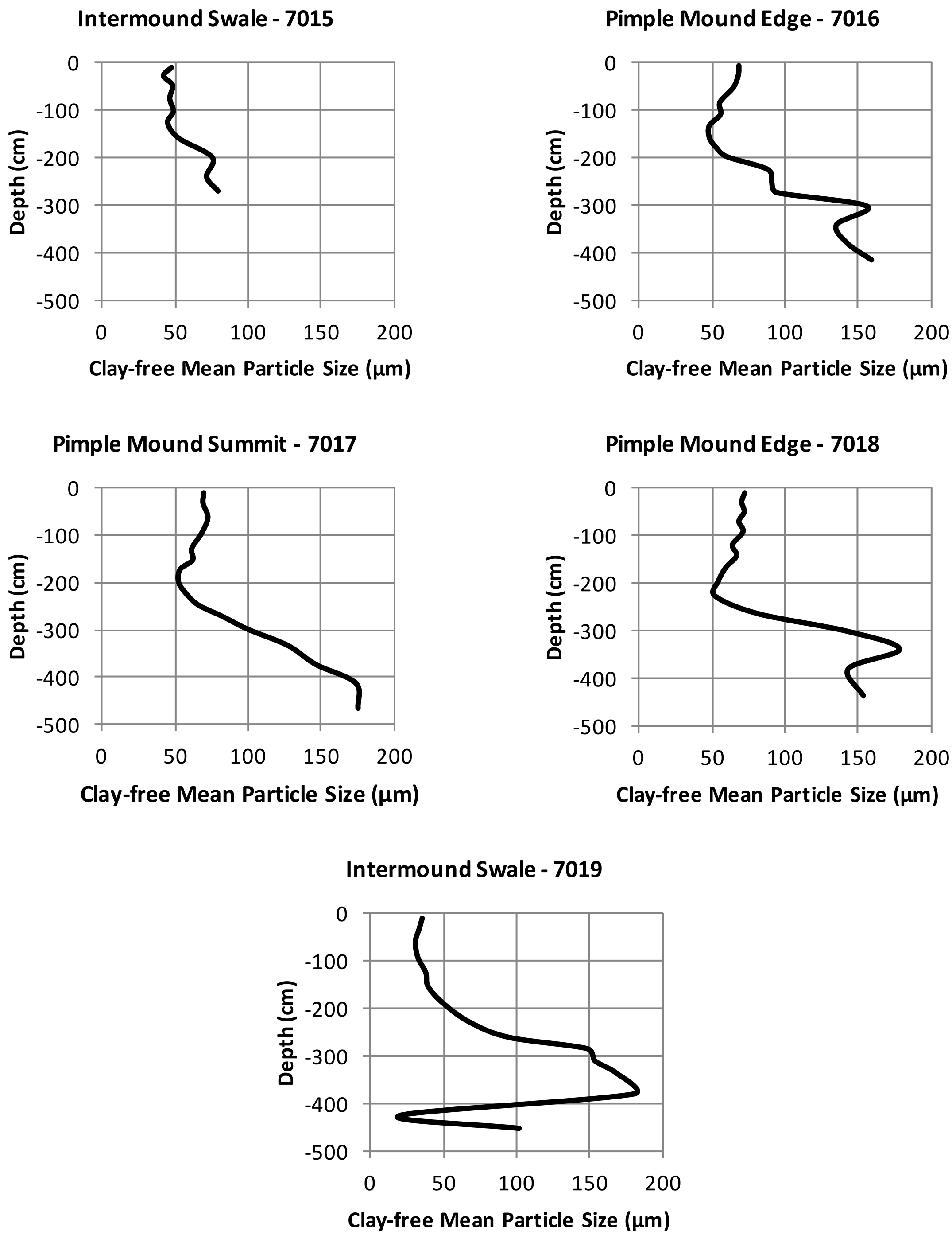


Fig. 35. Clay-free mean particle size (2-2000 µm fraction) with depth for the study soils at the T-5 (Leona Quad) Site. Pedons identified in relation to pimple mound and intermound positions.

samplings (Fig. 36). These lower standard deviations are associated with lateral accretion deposits. The poorly sorted sediments below 406 cm in pedon 7019 are representative of vertical accretion deposits prior to the lateral accretion on this site or are representative of Eocene-age residuum sediments.

A fining upward trend was observed in the five sampled pedons in Fig. 35, with pedon 7015 not sampled below a restrictive layer. Fluctuations as observed in the upper solum of pimple mound edges at younger sites were not observed on the older more eroded and weathered T-5 site. This may be a function of time of development or of the more confined and less variable sediment load of this narrow river valley which dissects the very fine and fine grained sands, interbeds of clay, silt partings, and glauconitic marl of the Eocene age Queen City, Sparta, and Weches geologic formations (Flawn, 1968).

Zone of Lateral Accretion

Further evidence for a fluvial origin is observed in Fig. 37 where the soil surface is compared to the top of materials deposited by lateral accretion. This relationship provides further evidence that the pimple mounds at this site are residual components of accretion ridges on point bar deposits associated with the meandering of the paleoriver as is illustrated by the curvilinear rows of mounds in Fig. 32. While clay and silt size particles were deposited during the stage of a lateral accretion depositional environment, most of the fine particles in this system were deposited after the river’s avulsion and movement to the east.

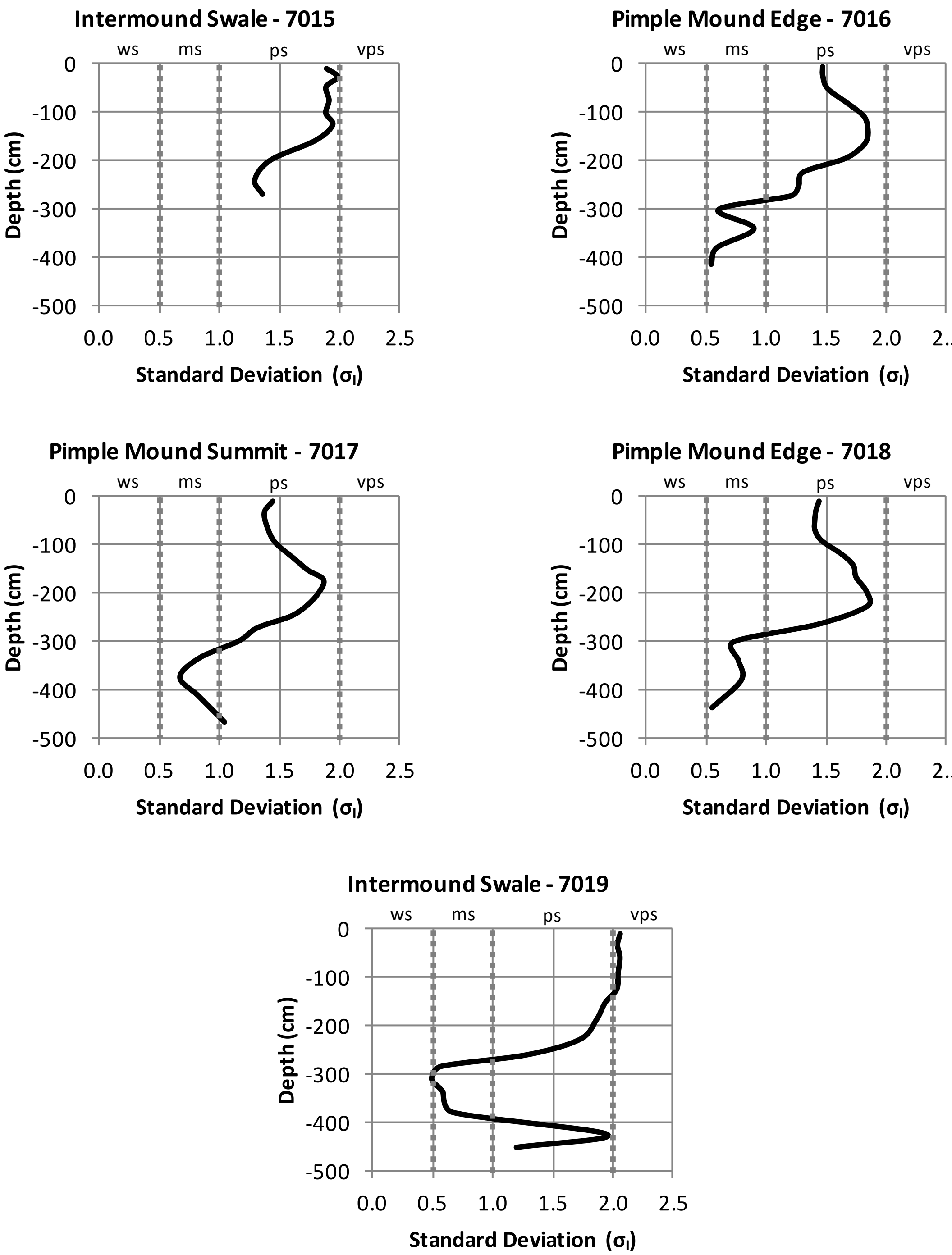


Fig. 36. Clay-free standard deviation of particle size distribution with depth for the study soils at the T-5 (Leona Quad) Site. Letters along the top margin give verbal limits for standard deviation: ws, well sorted; ms, moderately sorted; ps, poorly sorted; vps, very poorly sorted. Pedons are identified in relation to pimple mound, and intermound positions.

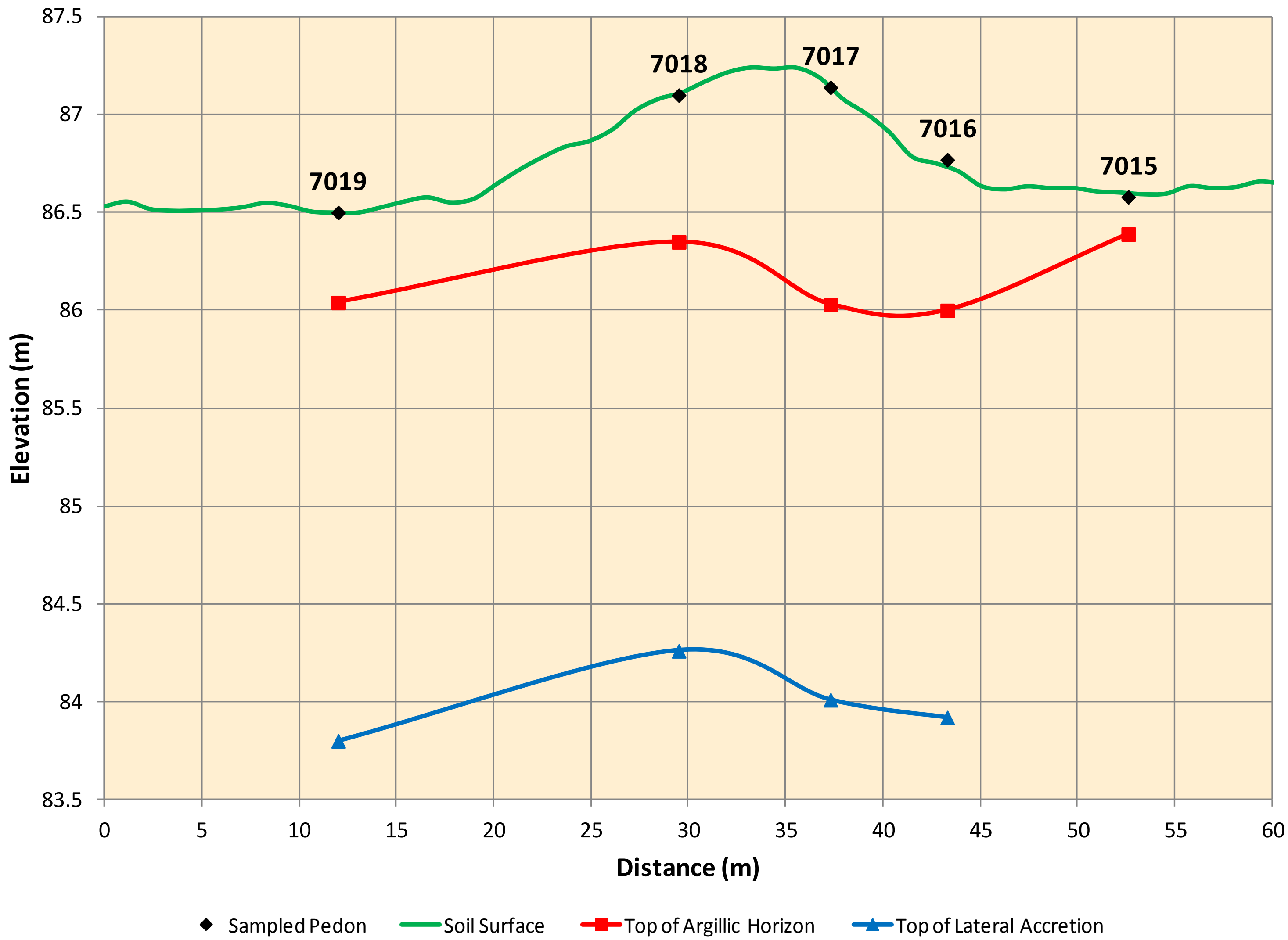


Fig. 37. Relation of lateral accretion to modern topography at T-5 (Leona Quad) Site.

The dynamic nature of rivers and fluvial environments makes determining the depth at which vertical accretion began and lateral accretion ended difficult. The decision considered the clay-free mean particle size, total sand content, and degree of sorting. The degree of sorting quantified by standard deviation of clay-free sediments was given the greatest weight.

Sediments of the zone of lateral accretion were deposited in a higher energy (velocity) depositional environment than the overbank deposits of vertical accretion, so the sediments of lateral accretion would be coarser than those of vertical accretion. At this site poorly sorted sediments with a standard deviation greater than 1.0 are attributed to the zone of vertical accretion, while moderately and well sorted sediments with a standard deviation of less than 1.0 are assigned to the zone of lateral accretion. The zone of lateral accretion in pedon 7015 was not determined due to a restrictive clay layer encountered at 280 cm. All sediments above that depth are over bank deposits of vertical accretion.

Lateral accretion in pedon 7016 begins at a depth of 285 cm and the top of the BC horizon. Indications supporting this conclusion include an increase in total sand from 66.2 to 82.8 percent, a coarsening of the clay-free mean particle size from 94.5 to 156 µm, and a transition from poorly sorted sediments (standard deviation of 1.1) to moderately sorted sediments (standard deviation of 0.6).

The zone of lateral accretion in pedon 7017 begins at a depth of 313 cm and the top of the BCt2 horizon. Data supporting this conclusion include an increase in total sand from 67.3 to 77.1 percent, a coarsening of the clay-free mean particle size from 100 to 128 µm, and a transition from poorly sorted sediments (standard deviation of 1.2) to moderately sorted sediments (standard deviation of 0.8).

Lateral accretion in pedon 7018 begins at a depth of 284 cm and the top of the BC horizon. Supporting this conclusion are an increase in total sand from 57.5 to 81.6 percent, coarsening of the clay-free mean particle size from 81.9 to 143 µm, and the transition from poorly sorted sediments (standard deviation of 1.4) to moderately sorted sediments (standard deviation of 0.7).

The zone of lateral accretion in pedon 7019 begins at a depth of 270 cm and the top of the BC horizon. This is supported by an increase in total sand from 68.9 to 84.6 percent, a coarsening of the clay-free mean particle size from 95.4 to 149 µm, and a transition from poorly sorted sediments (standard deviation of 1.3) to moderately sorted sediments (standard deviation of 0.6). As previously discussed the zone of lateral accretion ends at a depth of 406 cm and the top of the C3 horizon which has a clay-free mean particle size of 20.2 µm and poorly sorted sediments (standard deviation of 2.0) with a silt content of 41.7 percent and a clay content of 43.3 percent. Below this depth is what is believed to be over bank deposits over the underlying Eocene-Age residuum, or alternatively the C3 and C4 horizons may represent the Eocene-age sediments.

Remote Sensing Spatial Analyses

Pimple mounds, ridges, intermounds, and surrounding disturbance features were analyzed across the extent of the Rader-Derly complex, gently undulating and the Derly-Rader complex, gently undulating map units as presented in the Leon County, Texas, Soil Survey Geographic Database (SSURGO). A total of 7200 random observations were stratified by terrace level. Table 8 summarizes these observations by terrace level and a complete record of these observations is provided in Appendix D. Only the intermound, mound and ridge observations were included for the purposes of data analysis and illustration of trends. Observations listed as disturbed, other, out-of-map

Table 8. Summary of 7200 visual observations by terrace level. Observations are taken of shaded relief and other LiDAR derivatives by terrace level and spatial extent of map unit delineations by terrace level. Spatial extent excluded disturbed, other, out-of-map unit, shared corner, and water observations.

	T-1	T-2	T-3	T-4	T-5	Upland
Hectares	2710	294.7	416.1	1111	274.3	778.8
Hectares/observation	2.61	0.31	0.45	1.11	0.31	1.07
Intermound	809	751	733	797	834	669
Mound	55	65	183	186	49	43
Ridge	173	128	3	19	14	14
Total	1037	944	919	1002	897	726
			Excluded Observations			
Disturbed	71	65	113	35	35	28
Other	10	18	5	65	76	103
Out of map unit	69	68	66	75	70	109
Shared corner	9	99	87	18	116	228
Water	4	6	10	5	6	6

unit, shared corner, and water were excluded from all spatial data analyses. Definitions were developed and refined through observation for the purposes of initial analysis of remotely sensed data and are fully explained in the Materials and Methods section.

The map unit area affects the number of observations made across the extent of soils mapped on a particular terrace level. For example, the T-1 surface is of the greatest extent with regard to pimple mound complex mapping and of the 1037 observations which were not excluded from analyses, each observation represents 2.61 hectares. On the T-2 surfaces, which are of minor extent, the 944 observations represent 0.31 hectares per observation. Due to the lowest density of observations, the T-1 map units are those which might be affected by the sample size of the population. However given the similar trends observed visually across the T-1 level and the average size of map unit delineations of 60.1 hectares it is believed that the sample size of 1037 observations accounts for any minor variance that may occur relative to polygon density and extent.

Observations by terrace level yield findings which support a fluvial origin of pimple mound formation. This is evident in Fig. 38 and in statistical contingency table analyses which found a significant difference ($P < 0.05$) between three groupings of terrace levels (Appendix D). Trends indicate that the younger T-1 and T-2 surfaces exhibit the highest composition of ridges, T-3 and T-4 surfaces exhibit the highest composition of pimple mounds, while the older and more eroded T-5 and higher surfaces have the highest composition of intermound observations. This trend with increasing age shows that accretion ridges erode to pimple mounds, and pimple mounds eventually erode to a point at which they are less evident on the landscape.

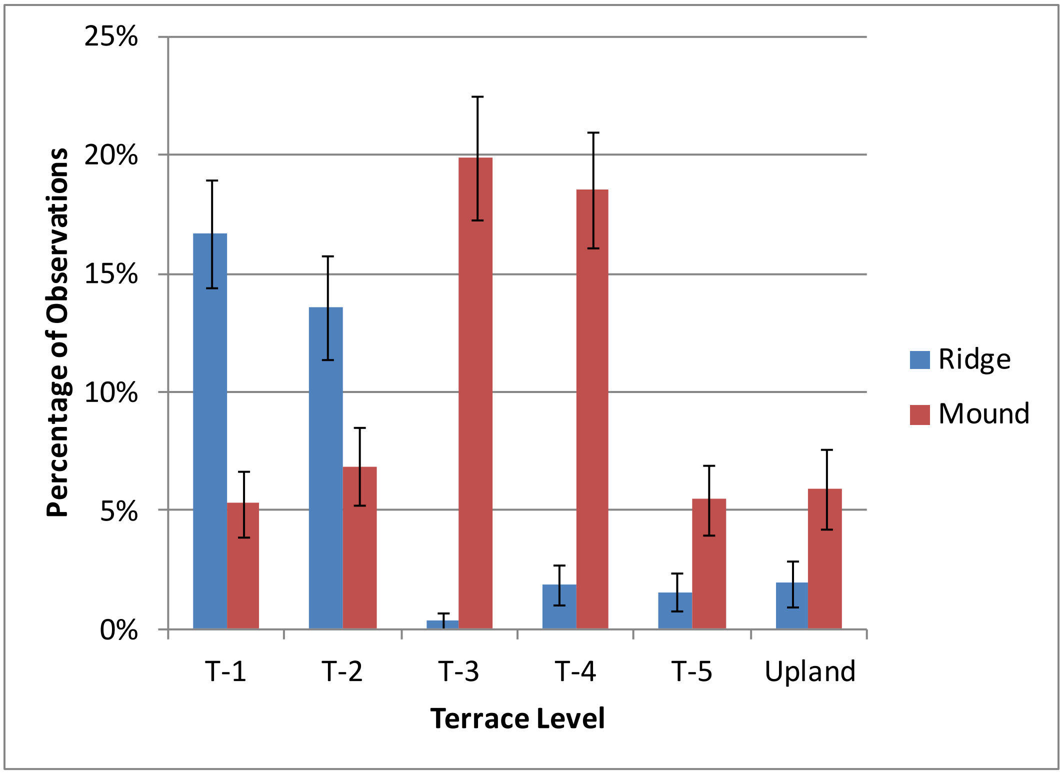


Fig. 38. Map unit composition of ridge and mounds by terrace level. Error bars represent 95% confidence interval.

Mound heights did not correlate well with the age of terrace surface (Fig. 39). This can partially be explained by the exclusion of pimple mounds less than 30 cm in height above intermound levels, but this data set if analyzed may show that as pimple mounds reach a given size, they erode more rapidly on all terrace surfaces although a larger composition of excluded mounds might be found on the higher more eroded surfaces. The T-3 surface had the greatest amount of human activity within the study area with the most roads, water impoundments, and structures which may have affected a larger portion of the population of higher mounds. However this is not a likely

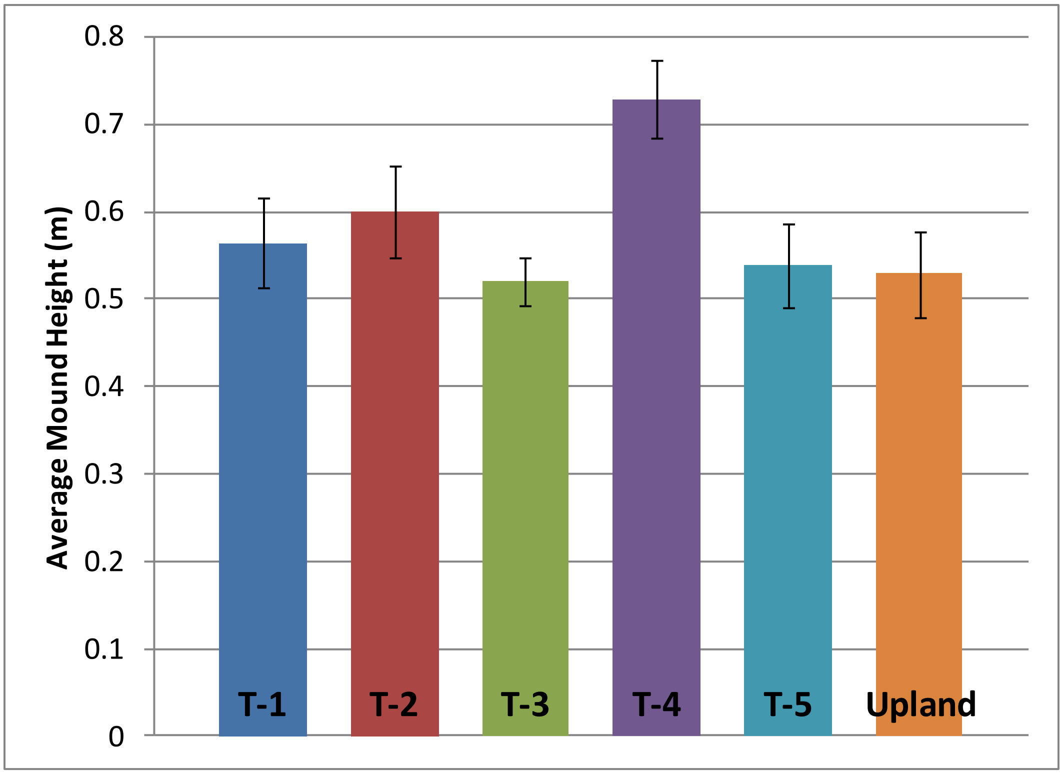


Fig. 39. Mean pimple mound height by terrace level. Error bars represent 95% confidence interval.

explanation given that only the T-4 surface pimple mound heights were significantly different ($P < 0.05$) than the other surfaces. This is attributed to the depositional environment of the T-4 surface during the middle to late Pleistocene as the paleoriver may have deposited much wider and higher accretion ridges than at the T-3 and younger stages.

Mound heights on the T-5 and higher surfaces are not significantly different from those recorded on the T-1, T-2, and T-3 surfaces, but more intermound areas are observed on these older surfaces with fewer mound observations indicating that with time, mounds are eroded from the landscape to a point at which they are not discernible from intermounds. If we consider that with time a greater probability exists for vegetation to be altered which destabilizes mounds and subjects the mounds to increased erosion.

Other observations included the frequent presence of arcuate rows of pimple mounds and curvilinear ridges which exhibit entirely different orientation patterns on the same surface (Fig. 40). This would preclude a hypothesis of eolian origin when one considers affects of wind direction. If ridges and mounds were originally deposited as windblown sediments, the ridges would correspond to a similar wind direction. Ridges were observed with several orientation patterns which correspond to a fluvial origin and not eolian.

In conclusion, pimple mound height may be better correlated to the depositional environment (if such data existed) of the pimple mound surface on which mounds formed rather than the age of the surface. The composition of mounds, ridges, and intermound areas correlate well with the time of development as ridges erode to pimple mounds and eventually pimple mounds erode leaving a greater extent of intermound areas and orientation of mounds and ridges correspond with a fluvial origin.

Pedogenesis as an Indicator of Pimple Mound Age

Morphological descriptions and observations on progressively older surfaces correspond with the time of development necessary to explain a fluvial origin for pimple mound genesis. This chronosequence is illustrated in Fig. 41 with the soils from the

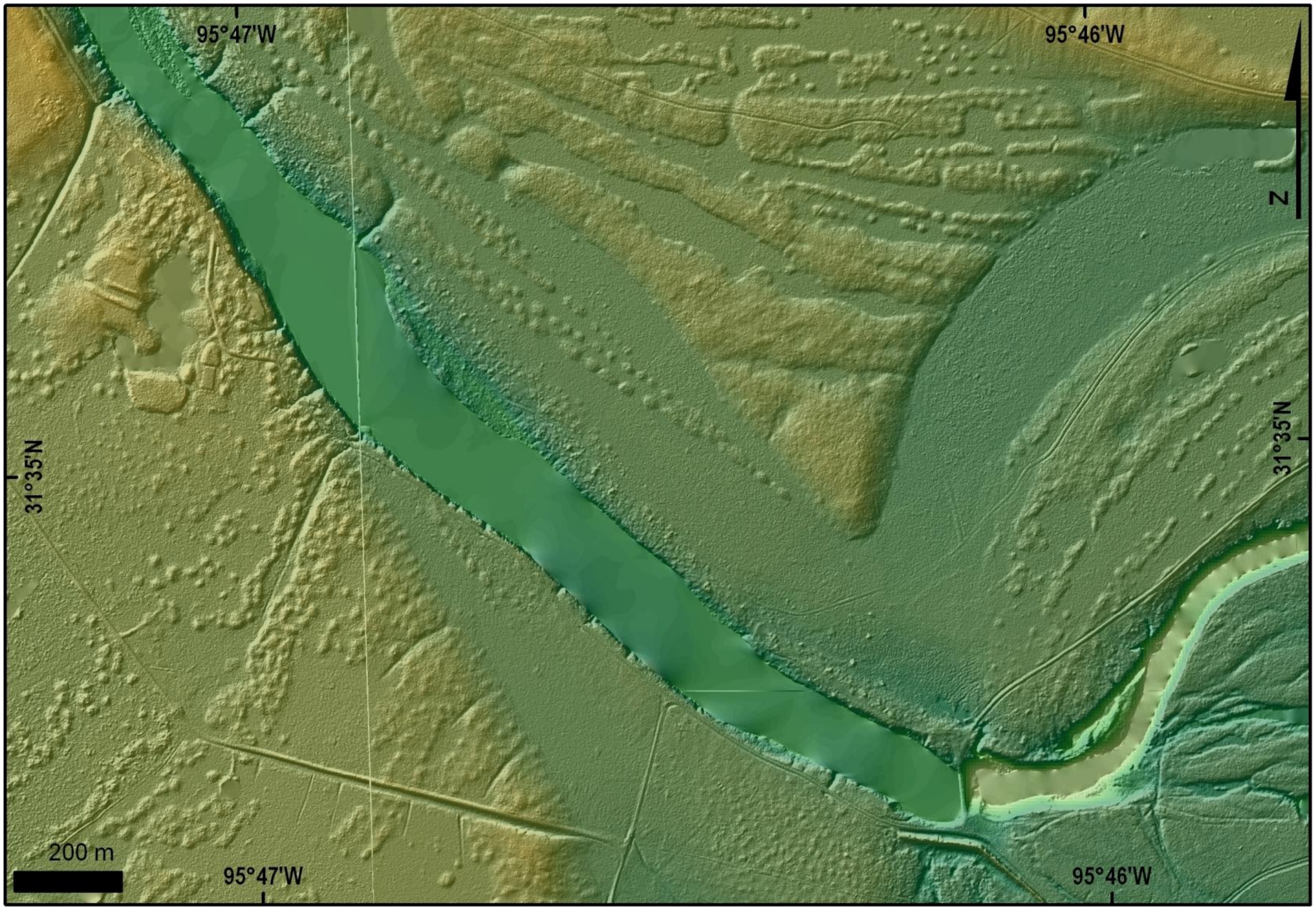


Fig. 40. Shaded relief image illustrates several orientations of pimple mounds. Arcuate rows of pimple mounds and ridges exhibit four different orientations associated with several river avulsions and downcutting events in northeastern Leon County. Orientation patterns do not follow a single similar wind direction or pattern. Rather, orientation is directly influenced by depositional environment.

pimple mound summits and meander ridge summit. Soils of the pimple mounds on the older surfaces (T-4 and T-5) are well developed with much thicker sola and a greater degree of pedogenesis than those formed on the younger T-1 and T-2 surfaces.

The T-1 Stanmire Lake Quad site is the lowest elevation surface (in relation to the modern floodplain) and is considered to be the youngest surface with pimple mounds within the study area. Pedons sampled at this site are identified as T-1 Ridge (Typic Hapludalf) and T-1 Mound (Aquic Arenic Hapludalf) in Fig. 41. From left to right, the age of the surface on which a pimple mound formed progressively increases in age. Concurrently, the degree of pedogenesis observed in mound pedons increases with surface age. Degree of pedogenesis is represented by the thickness of glossic and argillic horizons, solum thickness, and formation of plinthite in pimple mounds.

The thickness of glossic horizons and glossic features serves as an indicator of development of a pimple mound soil correlated to the development time as represented by the age of the terrace. The thickness of argillic horizons is interrelated to the age of a surface and pimple mounds, but may also be influenced by the underlying sediments and the thickness of overbank deposits as in the case of the T-2 Mound where the coarser sediments of the zone of lateral accretion are encountered at 220 cm depth which reduces downward movement of clay within this pedon due to the high porosity of these sediments.

A discussion of pedogenesis must consider processes of erosion which form and eventually destroy pimple mounds. The development of pimple mound soils over time shows that initially the dominant process at work is not one of erosion, but of deposition

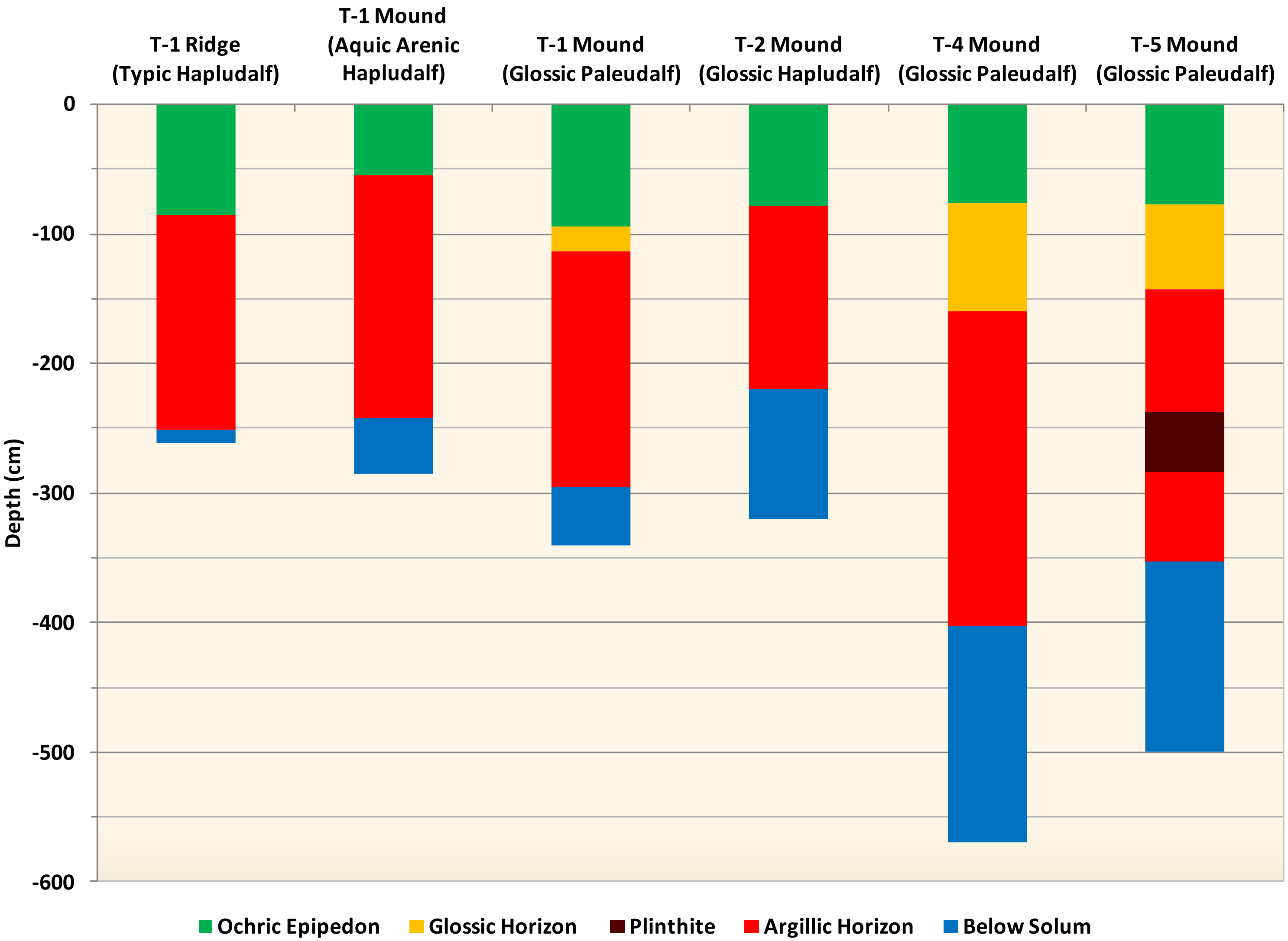


Fig. 41. Mound pedogenesis of the summit position across the chronosequence of sampling sites.

or vertical accretion of sediments by floodwaters as represented by the transition from stage 1 to stage 2 (Fig. 42). As curvilinear accretion ridges develop on point bar deposits, these features continue to receive deposition as is currently represented by the T-1 and T-2 surfaces of the Trinity River Valley which flood infrequently today during high rainfall events.

During the transition from stage 2 to stage 3, major shifts in climate, as were seen during the late Pleistocene and early Holocene, may have provided sufficient wet and dry periods to produce a change in plant community and the means for erosional segmentation of accretion ridges. Clay movement into the zone of lateral accretion is observed in the presence of a wet, humid climate (Fig. 43) and glossic horizons begin to develop. The initial erosional process of erosional segmentation may have been aided by the prior establishment of a closed canopy hardwood forest creating the arcuate rows of circular mounds as are present today on the T-1 and T-2 surfaces. One could speculate that the presence of large, deep-rooted vegetation equally spaced according to canopy width along ridges could provide sufficient structure for retaining soil around the "root balls" of deeply rooted, large trees while other areas without sufficient vegetative cover were preferentially eroded during major droughts.

Further erosional processes begin to erode away the remnant accretion ridges or pimple mounds altogether. The erosion or deformation of pimple mounds is evident by comparing the highest terrace surfaces (Stage 5 in Fig. 42) to the previous stage (Stage 4 in Fig. 42). At this stage pedogenesis continues, but erosion and soil loss represented by topography or relief begin to play an increasing role in soil development.

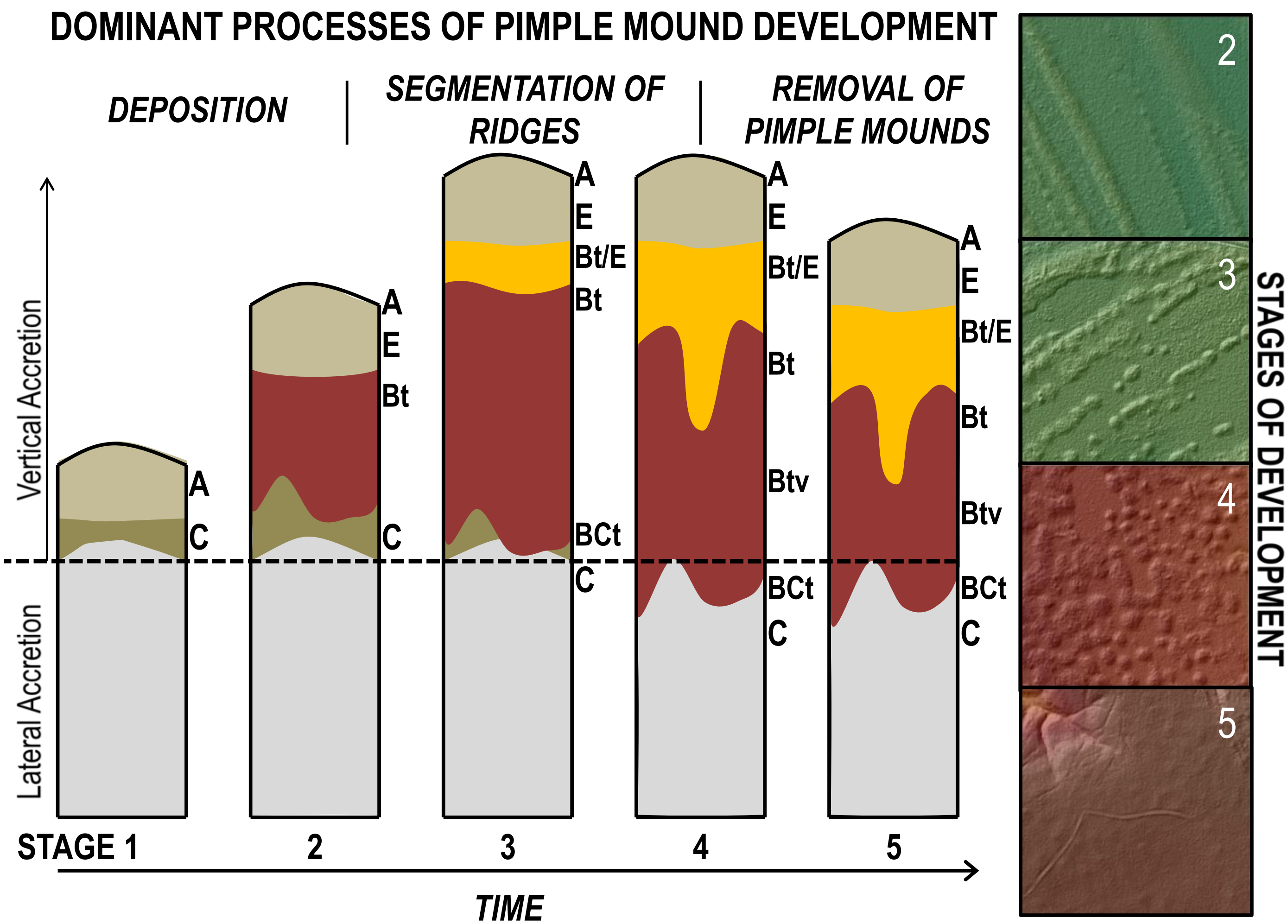


Fig. 42. Pimple mound development sequence. Diagram details the stages of mound formation and destruction over time. Inset LiDAR shaded relief images on right (1:2,500 scale) further illustrate stages 2, 3, 4, and 5.

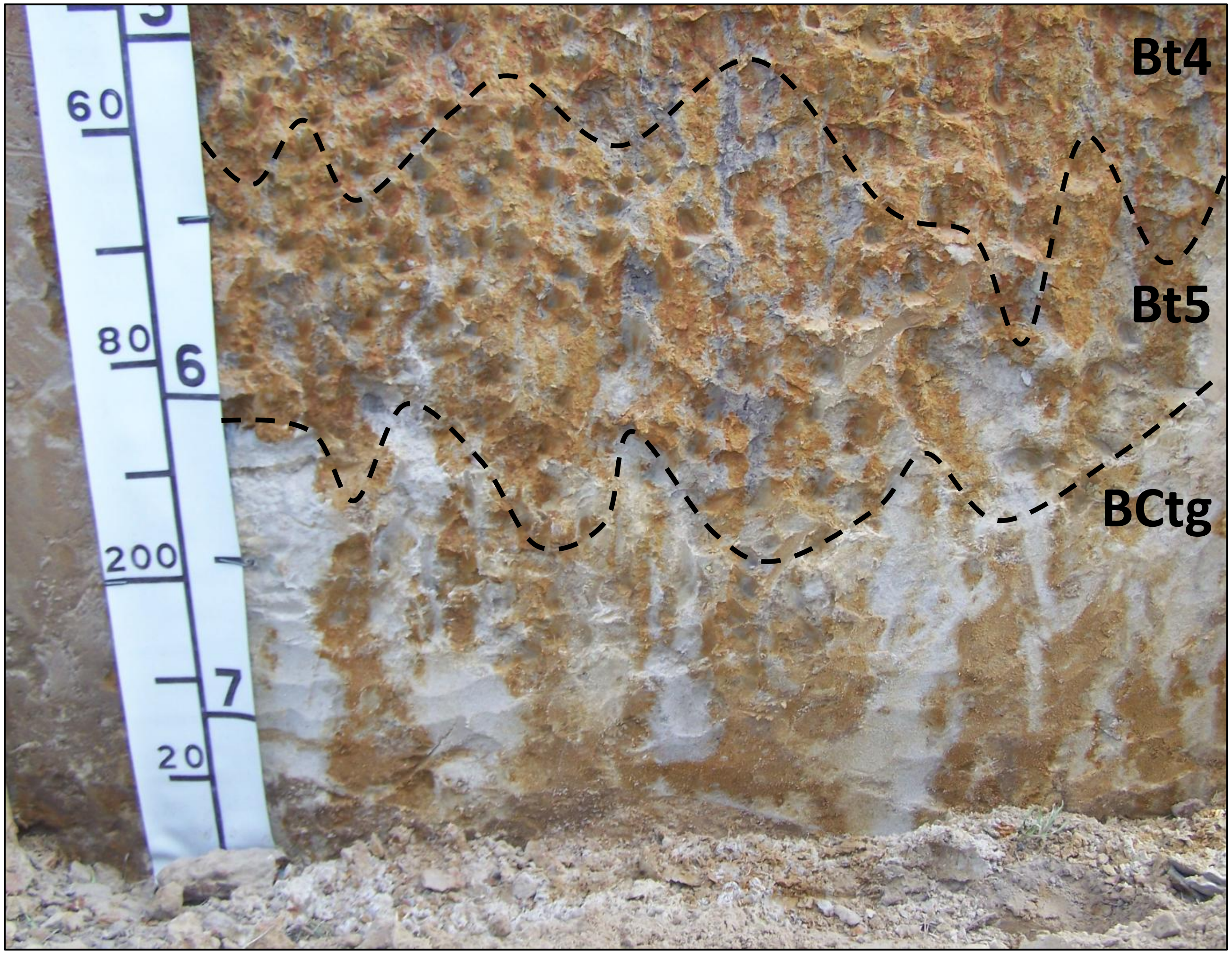


Fig. 43. Photograph of lower (Bt4, Bt5, and BCtg) horizons in Pedon 3. In the summit of the T-2 pimple mound, lateral accretion begins at 187 cm in the BCtg horizon. This photograph illustrates clay movement into the coarser sediments of the zone of lateral accretion on the T-2 surface.

SUMMARY AND CONCLUSIONS

Field study and spatial analyses of pimple mounds were performed to meet the following research objectives: (i) to assess current hypotheses of pimple mound genesis within the study area and across the range of pimple mounds in Texas; (ii) to identify a suitable method for making soil survey interpretations based on micro-scale landscape changes; and (iii) to provide a better understanding of the spatial trends and factors of pimple mound formation as affected by the five soil forming factors (Jenny, 1941) and exhibited by pimple mound morphology and characteristics. The study focused on pimple mound soils in Leon County, Texas. This area was selected due to the availability of LiDAR remotely sensed data and presence of pimple mounds on a range of surfaces.

Based on the second research objective, remotely sensed LiDAR data proved especially useful in east-central Texas where vegetative cover is not conducive to bare earth derivatives using other remote sensing techniques. Micro-scale landscape changes were found to be a good indicator of soil taxonomic changes across mound microtopography. Further sampling of soils across the expanse of mound-intermound soil map unit complexes is needed to correlate soil interpretations of low intermound inclusions and other transitional areas to a suitable model such as the Compound Topographic Index (CTI) (Sorensen et al., 2006), but initial observations are positive for correlating complex soils such as those observed in this study to LiDAR remote sensing techniques and usher in raster based soil maps in areas such as these broad complexes.

Based on the first research objective, the following current hypotheses of pimple mound genesis were selected for testing:

1. Eolian deposition associated with local reworking of sediments coupled with drier climates (Aronow, 2000; Carty et al., 1988) and intense climate change of the recent past (Holocene-age) (Cox, 2008; Seifert et al., 2009);
2. The work of burrowing animals, namely the plains pocket gopher (*Geomys bursarius* Shaw), by accretionary deposition of soil (Horwath and Johnson, 2006; Koons, 1948);
3. Erosional segmentation of accretion ridges on point bar deposits (Krinitzsky, 1949);
4. Erosional and depositional action by wind or water coupled with retention of residual soil hillocks or mounds by vegetation (Cain, 1974; Melton, 1935).

Current hypotheses of pimple mound genesis were analyzed within the framework of the third research objective with emphasis given to the interdependence of soil forming factors and spatial distribution. A chronosequence of geological surfaces was developed based on previously established terrace levels in the Trinity River Valley (Nordt, 1986), and six groups were identified for a stratified approach to field sampling and spatial analysis.

A pimple mound and adjacent meander ridge were described and sampled at the T-1 Stanmire Lake Site. This T-1 surface was determined to be the youngest exposure of pimple mounds in the study area from elevation and spatial analysis. Morphology and classification of soils indicate young soils with both pimple mound and ridge summit pedons classified as Hapludalfs. Site position, elevation, and observations indicate that sediments are deposited infrequently by floodwaters in modern times, which contribute to a complex depositional environment. A fining upward trend observed in clay-free sediments with depth suggested a fluvial origin. Poor sorting (standard deviation of > 1.0) of clay-free particle size distributions in the upper 2 m contradicted eolian deposition as a major factor in mound and ridge development. Subsurface trends observed in the top of the coarser sediments of the zone of lateral accretion correspond with the microtopography of the sampled mound and ridge surface and suggest a genetic connection between mound, ridge, and underlying coarse alluvial sediments.

A pimple mound was described and sampled at the T-1 Middleton Site. This T-1 surface exhibited a broad expanse of arcuate rows of pimple mounds and curvilinear ridges. Morphology and classification of soils indicate increased development and age when compared to the Stanmire Lake Site. The pimple mound summit met the classification of Paleudalf, but bordered on a classification of Hapludalf based on argillic horizon development and downward movement of clay in the pedon. A fining upward trend reflected a fluvial origin in the intermound and two of the mound pedons. One of the pimple mound edges did not exhibit a clear fining upward trend, but rather exhibited a similar coarsening from 1 to 2 m as was observed in the adjacent intermound. All pedons exhibited poor sorting (standard deviation of > 1.0) of clay-free particle size distributions in the upper 2 m which is incompatible with eolian deposition as a major factor in mound development. The coarser sediments of the top of the zone of lateral accretion correspond with the microtopography of the mound surface suggesting a genetic connection between pimple mound and underling coarse alluvial sediments.

A pimple mound was described and sampled at the T-2 Site. The T-2 surface exhibited arcuate rows of mounds and curvilinear ridges, but also included some areas less extensive in mound distribution that may be affected by frequent inundations of floodwaters from a nearby creek. Morphology provides some evidence that this soil is genetically similar in age to the pimple mound sampled at the T-1 Middleton Site. Characteristics include glossic features and acidic soil pH. Classification provides a younger classification than the T-1 surface, but this is attributed to the depth to underlying coarse sediments and water relationships. The T-2 site is influenced strongly by a nearby creek and the depth to coarse sediments of lateral accretion. Within the T-2 pimple mound, vertical accretion begins at 220 cm whereas in the T-1 Middleton Site pimple mound, vertical accretion begins at a depth of 295 cm. This difference may influence leaching depth and clay movement and allow the T-1 Middleton Site to exhibit signs of development in a shorter time than that of the T-2 Site. The T-2 Site exhibited the strongest correlation between the top of the zone of lateral accretion and the mound microtopography. The paleochannel positions represented by pedons sampled in the adjacent intermound areas showed signs of deposition events not observed in the mound. Flood waters today and when the paleoriver existed at the T-1 phase would have deposited fine sediments in these paleochannels with mounds influenced only by major flood events.

The T-4 Site and sampled pimple mound exhibit a complex depositional environment of the Trinity paleoriver. The T-4 surface yielded soils in the pimple mound and adjacent intermounds which are older based on morphology and classification (Paleudalfs and Glossudalfs). The depositional environment reflected in the clay-free particle size distributions varied greatly during construction. A fining upward trend was not observed at this site as was seen in other pimple mound and intermound pedons. Poor sorting (standard deviation of > 1.0) of particle size distributions throughout the upper 3 m preclude a hypothesis of eolian deposition. The coarser sediments of the zone of lateral accretion did not correspond with the microtopography of the mound surface as was observed at the other sites. This may be due to erroneous selection of transect direction for sampling or to what may have been an avulsion and subsequent return of the paleoriver when at this stage. While the T-1 and T-2 continue to actively receive deposition and potential erosion from the meandering Trinity River, the T-3 and older surfaces are disconnected from a river which downcut throughout the Pleistocene leaving what are today only the margins of what was once a mighty floodplain.

The T-5 surface at the selected T-5 Leona Site developed at a time when the Keechi Creek watershed had a substantially greater velocity and sediment load. This paleoriver formed several high terraces along a narrow river valley which today appear out of place given the nature of the modern watershed. This T-5 surface exhibits arcuate rows of pimple mounds surrounding broad intermound channels. Morphology and classification (Paleudalfs) show that these soils are the oldest observed in the study. A fining upward trend indicative of a fluvial origin was observed in the clay-free particle size distributions of all pedons. All pedons exhibited poor sorting (standard deviation of > 1.0) of clay-free particle size distributions in the upper 2 m which contradicts eolian deposition as a major factor in mound development. The coarser sediments of the top of the zone of lateral accretion correspond with the microtopography of the mound surface suggesting a genetic connection between pimple mound and underling coarse alluvial sediments.

Spatial analyses of pimple mound areas showed a relationship of mound and ridge distribution to terrace surface age with the T-1 and T-2 surfaces dominated by curvilinear ridges, the T-3 and T-4 surfaces dominated by pimple mounds, and the T-5 and high terrace (upland) surfaces dominated by fewer mounds than the younger surfaces. A process of development and destruction of pimple mounds is proposed from morphological and spatial observations across the extent of pimple mounds in the study area. This process details the landscape processes of deposition in younger mounds and ridges followed by erosional segmentation of ridges with decreased depositional events which transitions to an erosional stage of destruction or removal of mounds with time. This process is aided by time both from the perspective of river downcutting and loss of depositional environment. Climate changes over time were seen throughout the early Holocene and Pleistocene and would impact plant communities and potentially expose mounds to more erosion after repeated events of drought.

Eolian deposition was rejected as a dominant factor of mound development in the study area based on spatial and field sampling observations. While the pocket gopher and other bioturbators may play an important role in the deformation of pimple mounds and ridges, it is unlikely that burrowing animals deposited the sediments, and even less likely that any modern species of burrowing animal would orient rows of mounds and ridges in the patterns seen in the study which resemble that of fluvial meander belt deposits. The fourth hypothesis to be considered explains a process of deposition associated with vegetation on nearly level surfaces in which intense erosion and soil loss occurred between residual soil hillocks giving rise to pimple mounds. Given the correlation between mound microtopography and the underlying coarse sediments and the unlikely event that differential erosion on these nearly level surfaces would occur between clumps of vegetation, this hypothesis is also rejected. Further study of spatial trends coupled with field observations is needed across the extent of pimple mounds especially in coastal areas where potential eolian influences may be greater.

In conclusion pimple mounds within the study area formed in the presence of sandy to loamy alluvial sediments and require the presence of accretionary ridge microtopography over point bar deposits. Alluvial parent material and relief are further developed by fluctuations in climate and vegetation over time. The erosional influence of bioturbation by animals and the intense rainfall and flood events which frequent the study area provided an environment in which these soil microfeatures have developed and over time exhibit increased levels of pedogenesis. Although current sediment load and river velocity in the Trinity River watershed do not provide needed parameters for pimple mound development, should sea level change and the Trinity River watershed revert to the higher velocity of flow and coarser sediment load as seen in the Pleistocene, pimple mounds might again actively form and develop at all stages from point bar deposits to accretion ridge and eventually pimple mounds.

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APPENDIX A

SOIL MORPHOLOGICAL DESCRIPTIONS

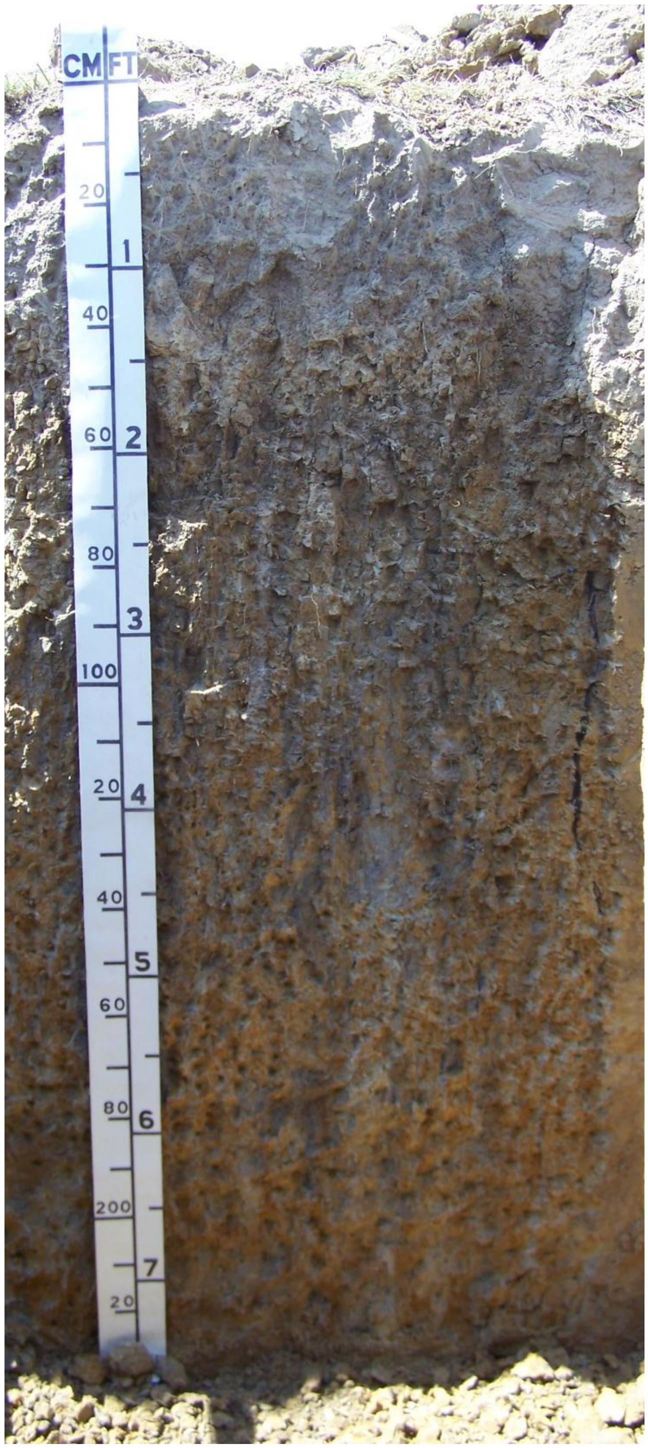

Fig. A-1. Photograph of pedon S11TX2890002 (courtesy of Dennis Brezina).

PEDON DESCRIPTION

Pedon ID: S11TX2890002
Description Date: 6/15/2011
Describer: C.T. Hallmark, D.N. Brezina, J.A. McCormick, A. Peer, R.M. Reid, R. Molina, J. Gordon, C.N. Langston, and C.M. Robinson
Site Notes: Text: T-2 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel between pimple mound and meander ridge.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Derly taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Aquertic Glossudalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°14’18.10679” north, 95°46’42.80949” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1.5 percent
Elevation: 56.9 meters
Aspect: 158°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: ANGL2 - bushy bluestem (*Andropogon glomeratus*); SPIN4 - smutgrass (*Sporobolus indicus*); CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); LOLIU - ryegrass (*Lolium*); RUBUS - blackberry (*Rubus*); BRAR5 - field brome (*Bromus arvensis*)
Parent Materials: alluvium
Particle Size Control Section: 42 to 92 centimeters
Diagnostic Features: Aquic conditions: 0 to 348 centimeters, Redox concentrations: 0 to 314 centimeters, Ochric epipedon: 0 to 42 centimeters, Redox depletions with chroma 2 or less: 12 to 83 centimeters, Argillic horizon: 42 to 230 centimeters, Glossic horizon: 42 to 61 centimeters, Slickensides: 61 to 133 centimeters, Reduced matrix: 83 to 133 centimeters, Redox depletions with chroma 2 or less: 133 to 168 centimeters, Reduced matrix: 168 to 230 centimeters, Redox depletions with chroma 2 or less: 230 to 289 centimeters, Endosaturation: 270 to 348 centimeters and Reduced matrix: 289 to 314 centimeters

Ap --- 0 to 12 centimeters; brown (10YR 4/3) moist, fine sandy loam; brown (10YR 5/3) dry; weak fine granular and moderate fine subangular blocky structure; firm, extremely hard; common fine roots, common coarse roots and many medium roots; common medium and common fine pores; 1 percent (few) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # 7745.

A --- 12 to 31 centimeters; dark grayish brown (10YR 4/2) moist, fine sandy loam; brown (10YR 5/3) dry; weak coarse subangular blocky structure; firm, extremely hard; common medium roots and common fine roots; common very fine pores; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) fine grayish brown (10YR 5/2), moist, iron depletions and 10 percent (common) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.2, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # 7746.

AB --- 31 to 42 centimeters; dark grayish brown (10YR 4/2) moist, fine sandy loam; brown (10YR 5/3) dry; weak coarse subangular blocky parting to moderate medium subangular blocky structure; firm, extremely hard; common fine roots; common very fine pores; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) grayish brown (10YR 5/2), moist, iron depletions and 5 percent (common) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # 7747.

Bt/E --- 42 to 61 centimeters; brown (10YR 5/3) moist and; brown (10YR 5/3) moist, sandy clay loam; pale brown (10YR 6/3) dry; strong medium angular blocky structure; very firm, extremely hard; moderately few medium roots and common fine roots; common very fine pores; 20 percent (few) skeletans and discontinuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese concretions, 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; clear wavy boundary; Lab sample # 7748.

Btss --- 61 to 83 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium angular blocky and moderate medium wedge structure; very firm; common fine roots and moderately few medium roots; few very fine pores; 5 percent (few) light brownish gray (10YR 6/2), moist, skeletans, discontinuous distinct slickensides (pedogenic) and discontinuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 2 percent (common) grayish brown (10YR 5/2), moist, iron depletions and 30 percent (many) brown (10YR 5/3), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: clay; gradual wavy boundary; Lab sample # 7749.

Btssg1 --- 83 to 102 centimeters; grayish brown (10YR 5/2) moist, clay loam; angular blocky and moderate medium wedge structure; very firm; moderately few medium roots and moderately few fine roots; few very fine pores; 2 percent (very few) light brownish gray (10YR 6/2), moist, skeletans, continuous distinct slickensides (pedogenic) and continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # 7750.

Btssg2 --- 102 to 133 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium wedge structure; very firm; moderately few fine roots; few very fine pores; patchy distinct slickensides (pedogenic) and continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) very dark gray (10YR 3/1), moist, iron-manganese masses, 3 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 30 percent (many) yellowish brown (10YR 5/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # 7751.

Bt --- 133 to 168 centimeters; variegated 33 percent strong brown (7.5YR 5/6) moist, exterior, 32 percent red (2.5YR 5/6) moist, interior and 32 percent light brownish gray (2.5Y 6/2) moist, exterior, sandy clay loam; weak coarse prismatic parting to moderate medium angular blocky structure; very firm; moderately few fine roots; few very fine pores; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron, 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 1 percent (few) black (10YR 2/1), moist, iron-manganese masses on surfaces along root channels; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # 7752.

Btg1 --- 168 to 188 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak coarse prismatic parting to moderate medium angular blocky structure; very firm; moderately few fine roots; few very fine pores; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) very dark gray (10YR 3/1), moist, iron-manganese masses and 25 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; gradual smooth boundary; Lab sample # 7753.

Btg2 --- 188 to 210 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak medium subangular blocky structure; firm; moderately few fine roots; few very fine pores; patchy distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 20 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # 7754.

Btg3 --- 210 to 230 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak coarse subangular blocky structure; friable; moderately few fine roots; patchy distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 20 percent (many) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # 7755.

BC --- 230 to 251 centimeters; yellowish brown (10YR 5/8) moist, fine sandy loam; weak coarse subangular blocky structure; firm; moderately few fine roots; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses lining pores and 25 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # 7756.

CB --- 251 to 289 centimeters; yellowish brown (10YR 5/6) moist, stratified, sandy clay loam; weak coarse subangular blocky structure; friable; moderately few fine roots; 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 40 percent (many) gray (10YR 6/1), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # 7757.

Cg --- 289 to 314 centimeters; greenish gray (10BG 6/1) moist, stratified, fine sandy loam; single grain; loose; very few fine roots; 20 percent (many) yellow (10YR 7/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; Field texture: fine sand; gradual smooth boundary; Lab sample # 7758.

C --- 314 to 348 centimeters; reddish yellow (7.5YR 6/6) moist, stratified, fine sand; single grain; loose; 5 percent (common) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Field texture: sand; Lab sample # 7759.

Fig. A-2. Photograph of pedon S11TX2890003 (courtesy of Dennis Brezina).

PEDON DESCRIPTION

Pedon ID: S11TX2890003
Description Date: 6/15/2011
Describer: C.T. Hallmark, D.N. Brezina, J.A. McCormick, A. Peer, R.M. Reid, R. Molina, J. Gordon, C.N. Langston, and C.M. Robinson
Site Notes: Text: T-2 terrace of the Trinity River system.
Pedon Notes: Text: Summit of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Glossic Hapludalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°14’18.05059” north, 95°46’43.32584” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 57.2 meters
Aspect: 158°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); BRAR5 - field brome (*Bromus arvensis*); LOLIU - ryegrass (*Lolium*); 2GA - annual grasses; CAREX - sedge (*Carex*)
Parent Materials: alluvium
Particle Size Control Section: 79 to 129 centimeters
Diagnostic Features: Redox concentrations: 0 to 285 centimeters, Ochric epipedon: 0 to 79 centimeters, Aquic conditions: 79 to 320 centimeters, Argillic horizon: 79 to 220 centimeters, Abrupt textural change: 79 centimeters (Restrictive layer), Albic material: 79 to 92 centimeters, Redox depletions with chroma 2 or less: 114 to 161 centimeters and Reduced matrix: 187 to 220 centimeters
Restrictions: Abrupt textural change: 79 centimeters

Ap --- 0 to 16 centimeters; brown (10YR 4/3) moist, fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky and weak fine subangular blocky structure; friable; common medium roots and common fine roots; common very fine and few fine pores; 1 percent (few) moderately cemented black (10YR 2/1), moist, iron-manganese concretions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # 7732.

A --- 16 to 31 centimeters; brown (10YR 4/3) moist, fine sandy loam; light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; friable; common fine roots and common medium roots; common very fine and few fine pores; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; clear smooth boundary; Lab sample # 7733.

E1 --- 31 to 59 centimeters; yellowish brown (10YR 5/4) moist, fine sandy loam; light gray (10YR 7/2) dry; weak medium subangular blocky structure; very friable; moderately few fine roots and common medium roots; common very fine and few fine pores; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # 7734.

E2 --- 59 to 79 centimeters; light yellowish brown (10YR 6/4) moist, fine sandy loam; very pale brown (10YR 7/4) dry; weak medium subangular blocky structure; very friable; moderately few fine roots and common medium roots; common very fine and few fine pores; 3 percent (common) yellowish brown (10YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # 7735.

Bt1 --- 79 to 92 centimeters; yellowish brown (10YR 5/4) moist, fine sandy loam; moderate medium angular blocky structure; firm; moderately few fine roots and moderately few medium roots; few very fine pores; 10 percent (few) light brownish gray (10YR 6/2), moist, skeletans and patchy distinct clay films on vertical faces of peds; 5 percent (common) pale brown (10YR 6/3), moist, iron depletions and 25 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; Field texture: sandy clay loam; abrupt smooth boundary; Lab sample # 7736.

Bt2 --- 92 to 114 centimeters; grayish brown (10YR 5/2) moist, sandy clay; moderate medium angular blocky structure; very firm; moderately few fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses on surfaces along root channels, 2 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 40 percent (many) coarse red (2.5YR 4/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: clay; clear wavy boundary; Lab sample # 7737.

Bt3 --- 114 to 134 centimeters; variegated yellowish brown (10YR 5/6) moist, sandy clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; continuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 20 percent (many) coarse red (2.5YR 4/8), moist, masses of oxidized iron and 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; clear wavy boundary; Lab sample # 7738.

Bt4 --- 134 to 161 centimeters; variegated yellowish brown (10YR 5/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; moderately few fine roots; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 25 percent (many) coarse red (2.5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; gradual wavy boundary; Lab sample # 7739.

Bt5 --- 161 to 187 centimeters; brown (7.5YR 5/4) moist, sandy clay loam; weak medium subangular blocky structure; firm; moderately few fine roots; patchy distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 30 percent (many) pale brown (10YR 6/3), moist, iron depletions and 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; clear smooth boundary; Lab sample # 7740.

BCtg --- 187 to 220 centimeters; variegated 30 percent light gray (10YR 7/2) moist, stratified, loamy fine sand; weak coarse subangular blocky structure; friable; patchy distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron, 30 percent (many) light yellowish brown (10YR 6/4), moist, masses of oxidized iron and 30 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: fine sandy loam and Coarse horizontal bedding planes present.; clear smooth boundary; Lab sample # 7741.

C1 --- 220 to 246 centimeters; very pale brown (10YR 7/3) moist, stratified, loamy fine sand; single grain; loose; 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 10 percent (common) light yellowish brown (10YR 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: fine sand and Horizontal strata of sand (10YR 6/4) at bottom of horizon 241-246cm.; clear smooth boundary; Lab sample # 7742.

C2 --- 246 to 285 centimeters; 60 percent brownish yellow (10YR 6/6) moist and 30 percent light gray (10YR 7/2) moist, stratified, fine sandy loam; massive; very friable; 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; electrical conductivity of 1.1 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 4; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: loamy fine sand and Vertical seams (2cm width) of sand (10YR 7/2) making up 30% of matrix.; gradual smooth boundary; Lab sample # 7743.

C3 --- 285 to 320 centimeters; brownish yellow (10YR 6/6) moist, stratified, fine sandy loam; massive; very friable; electrical conductivity of 1.1 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 4; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: loamy fine sand and Vertical seams (2cm width) of sand (10YR 7/2) making up 30% of matrix.; Lab sample # 7744.

Fig. A-3. Photograph of pedon S11TX2890004 (courtesy of Dennis Brezina).

PEDON DESCRIPTION

Pedon ID: S11TX2890004
Description Date: 6/15/2011
Describer: C.T. Hallmark, D.N. Brezina, J.A. McCormick, A. Peer, R.M. Reid, R. Molina, J. Gordon, C.N. Langston, and C.M. Robinson
Site Notes: Text: T-2 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel adjacent to pimple mound. Cracks (2mm) are 32cm apart from surface to 83cm depth. Krotovinas 50-100cm apart.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Derly taxadjunct
Classification: Fine, smectitic, thermic Chromic Vertic Endoaqualfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°14'17.93073" north, 95°46'44.32946" west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1.5 percent
Elevation: 56.6 meters
Aspect: 158°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: ANGL2 - bushy bluestem (*Andropogon glomeratus*); DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); HESU3 - camphorweed (*Heterotheca subaxillaris*)
Parent Materials: alluvium
Particle Size Control Section: 13 to 63 centimeters
Diagnostic Features: Redox concentrations: 0 to 337 centimeters, Aquic conditions: 0 to 337 centimeters, Reduced matrix: 0 to 337 centimeters, Ochric epipedon: 0 to 13 centimeters, Argillic horizon: 13 to 284 centimeters, Slickensides: 41 to 165 centimeters, Redox depletions with chroma 2 or less: 123 to 233 centimeters, Gypsum accumulations: 165 to 205 centimeters and Endosaturation: 229 to 337 centimeters

Ap --- 0 to 13 centimeters; dark grayish brown (10YR 4/2) moist, clay loam; grayish brown (10YR 5/2) dry; weak fine granular and weak coarse subangular blocky structure; very firm, extremely hard; common fine roots and common very fine roots; common very fine pores; 2 percent (common) medium prominent brown (7.5YR 4/4), moist, masses of oxidized iron on surfaces along root channels, 2 percent (common) fine prominent brown (7.5YR 4/4), moist, masses of oxidized iron on surfaces along root channels, 20 percent (many) fine prominent strong brown (7.5YR 5/6), moist, masses of oxidized iron on surfaces along root channels, 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions and 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; clear wavy boundary; Lab sample # 7760.

Btg1 --- 13 to 27 centimeters; dark grayish brown (10YR 4/2) moist, clay loam; grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; very firm, extremely hard; common very fine roots and common fine roots; common very fine pores clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions and 25 percent (many) fine prominent yellowish brown (10YR 5/8), moist, masses of oxidized iron on surfaces along root channels; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: sandy clay loam; clear wavy boundary; Lab sample # 7761.

Btg2 --- 27 to 41 centimeters; dark grayish brown (10YR 4/2) moist, clay loam; grayish brown (10YR 5/2) dry; moderate medium angular blocky structure; very firm, extremely hard; moderately few medium roots and common very fine roots; common very fine pores clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 3 percent (common) medium prominent strong brown (7.5YR 4/6), moist, masses of oxidized iron on surfaces along root channels and 25 percent (many) medium prominent strong brown (7.5YR 5/6), moist, masses of oxidized iron on surfaces along root channels; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: clay; clear wavy boundary; Lab sample # 7762.

Btssg1 --- 41 to 54 centimeters; dark grayish brown (10YR 4/2) moist, clay; grayish brown (10YR 5/2) dry; moderate medium angular blocky and moderate medium wedge structure; very firm, extremely hard; common very fine roots and moderately few medium roots; common very fine pores clay films on vertical faces of peds, 30 percent (common) continuous slickensides (pedogenic) and 1 percent (very few) distinct light gray (10YR 7/2), moist, sand coats on vertical faces of peds; 2 percent (common) medium prominent yellowish red (5YR 4/6), moist, masses of oxidized iron lining pores and 25 percent (many) medium distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron lining pores; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; gradual wavy boundary; Lab sample # 7763.

Btssg2 --- 54 to 83 centimeters; dark grayish brown (10YR 4/2) moist, clay; light brownish gray (10YR 6/2) dry; moderate medium angular blocky and moderate medium wedge structure; very firm, extremely hard; common very fine roots, moderately few fine roots and moderately few medium roots clay films on vertical faces of peds and 40 percent (common) continuous slickensides (pedogenic); 2 percent (common) medium black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) medium prominent reddish brown (5YR 4/4), moist, masses of oxidized iron lining pores and 25 percent (many) medium prominent strong brown (7.5YR 5/6), moist, masses of oxidized iron lining pores; electrical conductivity of 0.6 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; gradual wavy boundary; Lab sample # 7764.

Btssg3 --- 83 to 123 centimeters; grayish brown (10YR 5/2) moist, clay loam; light brownish gray (10YR 6/2) dry; moderate medium angular blocky and moderate medium wedge structure; very firm, extremely hard; common very fine roots clay films on vertical faces of peds and slickensides (pedogenic); 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) medium prominent strong brown (7.5YR 4/6), moist, masses of oxidized iron on faces of peds and 30 percent (many) medium prominent yellowish brown (10YR 5/6), moist, masses of oxidized iron on faces of peds; electrical conductivity of 1.8 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 4; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: clay; gradual wavy boundary; Lab sample # 7765.

Btssg4 --- 123 to 165 centimeters; dark gray (10YR 4/1) moist, clay loam; moderate medium wedge structure; very firm; moderately few very fine roots clay films on vertical faces of peds and slickensides (pedogenic); 4 percent (common) medium black (10YR 2/1), moist, iron-manganese masses, 7 percent (common) medium faint gray (10YR 5/1), moist, iron depletions on faces of peds and 30 percent (many) medium prominent dark yellowish brown (10YR 4/6), moist, masses of oxidized iron on faces of peds; electrical conductivity of 2.8 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 4; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; Field texture: clay; clear wavy boundary; Lab sample # 7766.

Btyg1 --- 165 to 190 centimeters; dark gray (N 4/) moist, clay loam; weak coarse subangular blocky structure; very firm; moderately few very fine roots clay films on vertical faces of peds; 10 percent (common) medium black (10YR 2/1), moist, iron-manganese masses, 10 percent (common) medium distinct gray (10YR 5/1), moist, iron depletions on faces of peds and 30 percent (many) medium distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron on faces of peds; 10 percent (common) medium gypsum crystal clusters; electrical conductivity of 3.4 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; gradual wavy boundary; Lab sample # 7767.

Btyg2 --- 190 to 205 centimeters; light greenish gray (10Y 7/1) moist, sandy clay loam; weak coarse subangular blocky structure; firm; moderately few very fine roots clay films on vertical faces of peds; 7 percent (common) black (10YR 2/1), moist, iron-manganese masses, 10 percent (common) gray (5Y 5/1), moist, iron depletions on faces of peds and 25 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron on faces of peds; 1 percent (few) finely disseminated gypsum; krotovinas; electrical conductivity of 3.1 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 2; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; Field texture: clay loam and Krotovinas (5Y 4/1) about 6-10cm apart.; gradual wavy boundary; Lab sample # 7768.

B'tg --- 205 to 233 centimeters; light gray (2.5Y 7/1) moist, sandy clay loam; weak coarse subangular blocky structure; firm; moderately few very fine roots clay films on vertical faces of peds; 20 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 10 percent (common) light gray (N 7/), moist, iron depletions; electrical conductivity of 1.7 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; gradual wavy boundary; Lab sample # 7769.

BCtg --- 233 to 257 centimeters; light greenish gray (10BG 7/1) moist, sandy clay loam; weak coarse subangular blocky structure; firm; moderately few medium roots and moderately few very fine roots pores; 20 percent (many) coarse brownish yellow (10YR 6/6), moist, masses of oxidized iron; electrical conductivity of 1.9 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; slightly acid, pH 6.3, pH meter 1:1 water; gradual wavy boundary; Lab sample # 7770.

CBtg --- 257 to 284 centimeters; greenish gray (5BG 6/1) moist, stratified, fine sandy loam; weak coarse subangular blocky structure; friable; 20 percent (many) coarse brownish yellow (10YR 6/6), moist, masses of oxidized iron; electrical conductivity of 1.6 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; slightly acid, pH 6.5, pH meter 1:1 water; clear smooth boundary; Lab sample # 7771.

Cg1 --- 284 to 308 centimeters; greenish gray (5BG 6/1) moist, stratified, very fine sandy loam; massive; friable; 1 percent (few) brownish yellow (10YR 6/6), moist, masses of oxidized iron; electrical conductivity of 1.5 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # 7772.

Cg2 --- 308 to 337 centimeters; greenish gray (10BG 6/1) moist, stratified, very fine sandy loam; massive; friable; 15 percent (common) coarse yellowish brown (10YR 5/8), moist, masses of oxidized iron; electrical conductivity of 1.7 mmhos/cm by EC meter, saturated paste; sodium absorption ratio of 3; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: fine sandy loam; Lab sample # 7773.

PEDON DESCRIPTION

Pedon ID: S11TX2897001
Description Date: 4/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Edge of meander ridge.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rodessa
Classification: Fine, smectitic, thermic Aquic Glossudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’47.97851” north, 95°43’52.10899” west
Landscape: river valley
Landform: stream terrace
Microfeature: mound
Slope: 0.1 percent
Elevation: 59.6 meters
Aspect: 207°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: RUBUS - blackberry (*Rubus*); OPUNT - pricklypear (*Opuntia*); HOPU - little barley (*Hordeum pusillum*); BRAR5 - field brome (*Bromus arvensis*); NALE3 - Texas wintergrass (*Nassella leucotricha*); SEPA10 - knotroot bristlegrass (*Setaria parviflora*); 2GA - annual grasses
Parent Materials: alluvium
Particle Size Control Section: 53 to 103 centimeters
Diagnostic Features: Ochric epipedon: 0 to 38 centimeters, Redox concentrations: 22 to 222 centimeters, Glossic horizon: 38 to 53 centimeters, Reduced matrix: 53 to 152 centimeters, Argillic horizon: 53 to 206 centimeters, Aquic conditions: 53 to 267 centimeters, Secondary carbonates: 132 to 184 centimeters and Reduced matrix: 184 to 267 centimeters

Ap --- 0 to 22 centimeters; dark brown (10YR 3/3) moist, fine sandy loam; brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; noneffervescent by HCl, 1 normal; slightly acid, pH 6.3, pH meter 1:1 water; Field Texture: fine sandy loam; abrupt smooth boundary; Lab sample # E3836.

E --- 22 to 38 centimeters; brown (10YR 5/3) moist, fine sandy loam; weak medium subangular blocky structure; friable; 10 percent (common) fine yellowish brown (10YR 5/4), moist, masses of oxidized iron and 10 percent (common) medium yellowish brown (10YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: fine sandy loam; clear wavy boundary; Lab sample # E3837.

E/Bt --- 38 to 53 centimeters; yellowish brown (10YR 5/6) moist and; yellowish brown (10YR 5/4) moist, fine sandy loam; weak medium subangular blocky structure; friable; 1 percent (few) fine yellowish red (5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.5, pH meter 1:1 water; Field texture: fine sandy loam; clear wavy boundary; Lab sample # E3838.

Btg1 --- 53 to 77 centimeters; grayish brown (10YR 5/2) moist, sandy clay; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 10 percent (common) coarse yellowish brown (10YR 5/4), moist, iron-manganese masses, 10 percent (common) medium yellowish brown (10YR 5/4), moist, iron-manganese masses and 10 percent (common) medium strong brown (7.5YR 5/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3839.

Btg2 --- 77 to 103 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; continuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 2 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3840.

Btg3 --- 103 to 132 centimeters; grayish brown (10YR 5/2) moist, sandy clay; moderate medium angular blocky structure; very firm; continuous distinct dark grayish brown (10YR 4/2), moist, clay films on vertical faces of peds and discontinuous distinct light brownish gray (10YR 6/2), moist, sand coats on vertical faces of peds; 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 40 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3841.

Btkg --- 132 to 152 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on all faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese concretions, 2 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron, 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 30 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; 1 percent (few) fine masses of carbonate; 1 percent carbonate concretions; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3842.

Btk1 --- 152 to 171 centimeters; light olive brown (2.5Y 5/3) moist, sandy clay loam; weak medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on all faces of peds; 5 percent (common) black (10YR 2/1), moist, iron-manganese masses and 40 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 3 percent (common) fine threadlike masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3843.

Btk2 --- 171 to 184 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; weak medium angular blocky structure; firm; patchy distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 20 percent (many) pale brown (10YR 6/3), moist, iron depletions; 2 percent (common) fine threadlike masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3844.

BCtg --- 184 to 206 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak medium subangular blocky structure; firm; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 40 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3845.

CBg --- 206 to 222 centimeters; gray (10YR 6/1) moist, stratified, very fine sandy loam; weak coarse subangular blocky structure; friable; 15 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3846.

Cg --- 222 to 267 centimeters; light gray (10YR 7/1) moist, stratified, fine sand; single grain; loose; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; Field texture: fine sand; Lab sample # E3847.

PEDON DESCRIPTION

Pedon ID: S11TX2897002
Description Date: 4/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Summit of meander ridge.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Austonio
Classification: Fine-loamy, siliceous, active, thermic Typic Hapludalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’47.81299” north, 95°43’52.22062” west
Landscape: river valley
Landform: stream terrace
Microfeature: mound
Slope: 0.1 percent
Elevation: 60 meters
Aspect: 207°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: RUBUS - blackberry (*Rubus*); OPUNT - pricklypear (*Opuntia*); HOPU - little barley (*Hordeum pusillum*); BRAR5 - field brome (*Bromus arvensis*); NALE3 - Texas wintergrass (*Nassella leucotricha*); SEPA10 - knotroot bristlegrass (*Setaria parviflora*); 2GA - annual grasses
Parent Materials: alluvium
Particle Size Control Section: 85 to 135 centimeters
Diagnostic Features: Ochric epipedon: 0 to 85 centimeters, Redox concentrations: 21 to 55 centimeters, Redox concentrations: 67 to 261 centimeters, Abrupt textural change: 85 centimeters (Restrictive layer), Argillic horizon: 85 to 251 centimeters, Redox depletions with chroma 2 or less: 85 to 135 centimeters, Aquic conditions: 110 to 261 centimeters, Reduced matrix: 110 to 159 centimeters, Redox depletions with chroma 2 or less: 159 to 195 centimeters, Redox depletions with chroma 2 or less: 221 to 261 centimeters and Reduced matrix: 251 to 261 centimeters
Restrictions: Abrupt textural change: 85 centimeters

Ap --- 0 to 21 centimeters; dark grayish brown (10YR 4/2) moist, fine sandy loam; grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; Field texture: fine sandy loam; abrupt smooth boundary; Lab sample # E3848.

A --- 21 to 32 centimeters; dark brown (10YR 3/3) moist, very fine sandy loam; brown (10YR 4/3) dry; weak medium subangular blocky and weak fine subangular blocky structure; friable; 25 percent (many) fine pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3849.

E1 --- 32 to 45 centimeters; brown (10YR 5/3) moist, loamy fine sand; weak fine subangular blocky structure; very friable; 25 percent (many) medium pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E3850.

E2 --- 45 to 55 centimeters; pale brown (10YR 6/3) moist, loamy fine sand; weak fine subangular blocky structure; very friable; 10 percent (common) brown (10YR 5/3), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E3851.

E3 --- 55 to 67 centimeters; brown (10YR 5/3) moist, loamy fine sand; weak fine subangular blocky structure; very friable; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E3852.

E4 --- 67 to 85 centimeters; pale brown (10YR 6/3) moist, loamy fine sand; weak fine subangular blocky structure; very friable; 5 percent (common) fine distinct yellowish brown (10YR 5/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E3853.

Bt --- 85 to 110 centimeters; yellowish brown (10YR 5/6) moist, fine sandy loam; moderate medium subangular blocky structure; firm; 5 percent (common) light yellowish brown (10YR 6/4), moist, masses of oxidized iron, 5 percent (common) very fine light brownish gray (10YR 6/2), moist, iron depletions and 15 percent (common) medium grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3854.

Btg1 --- 110 to 135 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) dark grayish brown (10YR 4/2), moist, iron-manganese masses and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.3, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3855.

Btg2 --- 135 to 159 centimeters; gray (10YR 5/1) moist, sandy clay; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on all faces of peds; 5 percent (common) fine yellowish red (5YR 4/6), moist, masses of oxidized iron and 15 percent (common) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3856.

B't1 --- 159 to 195 centimeters; yellowish brown (10YR 5/4) moist, sandy clay loam; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 10 percent (common) medium prominent yellowish red (5YR 4/8), moist, masses of oxidized iron and 25 percent (many) grayish brown (10YR 5/2), moist, iron depletions; 1 percent (few) fine barite crystals; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter 1:1 water; Root tracings along faces of peds. and Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3857.

B't2 --- 195 to 221 centimeters; brown (10YR 5/3) moist, sandy clay loam; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 25 percent (many) dark yellowish brown (10YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter 1:1 water; Field texture: sandy clay loam; abrupt smooth boundary; Lab sample # E3858.

BCt --- 221 to 251 centimeters; brown (10YR 5/3) moist, stratified, very fine sandy loam; weak medium subangular blocky structure; friable; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 15 percent (common) light brownish gray (2.5Y 6/2), moist, iron depletions and 25 percent (many) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E3859.

Cg --- 251 to 261 centimeters; light gray (10YR 7/1) moist, stratified, very fine sandy loam; single grain; loose; 1 percent (few) black (10YR 2/1), moist, iron-manganese concretions and 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; Field texture: fine sand; Lab sample # E3860.

PEDON DESCRIPTION

Pedon ID: S11TX2897003
Description Date: 4/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Edge of meander ridge.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Yeaton
Classification: Fine-loamy, siliceous, active, thermic Aquic Hapludalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’47.66238” north, 95°43’52.35056” west
Landscape: river valley
Landform: stream terrace
Microfeature: mound
Slope: 0.1 percent
Elevation: 59.9 meters
Aspect: 207°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: RUBUS - blackberry (*Rubus*); OPUNT - pricklypear (*Opuntia*); HOPU - little barley (*Hordeum pusillum*); BRAR5 - field brome (*Bromus arvensis*); NALE3 - Texas wintergrass (*Nassella leucotricha*); SEPA10 - knotroot bristlegrass (*Setaria parviflora*); 2GA - annual grasses
Parent Materials: alluvium
Particle Size Control Section: 44 to 94 centimeters
Diagnostic Features: Ochric epipedon: 0 to 44 centimeters, Redox concentrations: 16 to 29 centimeters, Abrupt textural change: 44 centimeters (Restrictive layer), Aquic conditions: 44 to 275 centimeters, Redox concentrations: 44 to 251 centimeters, Argillic horizon: 44 to 251 centimeters, Redox depletions with chroma 2 or less: 44 to 144 centimeters and Reduced matrix: 144 to 275 centimeters
Restrictions: Abrupt textural change: 44 centimeters

Ap --- 0 to 16 centimeters; very dark grayish brown (10YR 3/2) moist, fine sandy loam; weak fine subangular blocky and weak medium subangular blocky structure; friable; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3861.

A --- 16 to 29 centimeters; dark grayish brown (10YR 4/2) moist, fine sandy loam; moderate medium subangular blocky structure; friable; 1 percent (few) fine distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: fine sandy loam; abrupt smooth boundary; Lab sample # E3862.

E --- 29 to 44 centimeters; brown (10YR 5/3) moist, loamy fine sand; weak medium subangular blocky structure; very friable; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E3863.

Bt1 --- 44 to 63 centimeters; brown (10YR 5/3) moist, fine sandy loam; weak medium subangular blocky structure; firm; continuous distinct clay films on vertical faces of peds; 5 percent (common) medium distinct grayish brown (10YR 5/2), moist, iron depletions throughout and 35 percent (many) coarse distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron throughout; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3864.

Bt2 --- 63 to 96 centimeters; brown (10YR 5/3) moist, sandy clay loam; moderate medium angular blocky structure; very firm; very fine roots between peds and fine roots between peds; continuous distinct dark grayish brown (10YR 4/2), moist, clay films on vertical faces of peds and patchy distinct skeletans on vertical faces of peds; 10 percent (common) fine distinct grayish brown (10YR 5/2), moist, iron depletions in matrix and 15 percent (common) medium distinct dark yellowish brown (10YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3865.

Bt3 --- 96 to 125 centimeters; brown (10YR 5/3) moist, sandy clay; moderate medium angular blocky structure; very firm; very fine roots between peds and fine roots between peds; patchy distinct skeletans on vertical faces of peds and continuous distinct brown (10YR 4/3), moist, clay films on vertical faces of peds; 1 percent (few) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 25 percent (many) fine distinct grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3866.

Btk --- 125 to 144 centimeters; light olive brown (2.5Y 5/6) moist, sandy clay loam; moderate medium angular blocky structure; very firm; patchy distinct grayish brown (10YR 5/2), moist, clay films on all faces of peds; 1 percent (few) reddish brown (2.5YR 4/4), moist, masses of oxidized iron and 20 percent (many) gray (10YR 6/1), moist, iron depletions; 1 percent (few) coarse masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; fine and medium root tracings. and Field texture: clay; clear smooth boundary; Lab sample # E3867.

Btkg --- 144 to 175 centimeters; gray (2.5Y 6/1) moist, sandy clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct light brownish gray (10YR 6/2), moist, clay films on all faces of peds; 5 percent (common) medium yellowish red (5YR 5/6), moist, masses of oxidized iron and 35 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; 2 percent (common) coarse moderately cemented carbonate concretions; 3 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3868.

Btg1 --- 175 to 198 centimeters; gray (2.5Y 6/1) moist, sandy clay loam; moderate medium angular blocky structure; very firm; very few fine roots; continuous distinct gray (10YR 6/1), moist, clay films on vertical faces of peds; 1 percent (few) yellowish red (5YR 5/6), moist, masses of oxidized iron, 8 percent (common) moderately cemented black (10YR 2/1), moist, iron-manganese concretions and 40 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; 1 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3869.

Btg2 --- 198 to 220 centimeters; light brownish gray (2.5Y 6/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; continuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 40 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3870.

Btg3 --- 220 to 238 centimeters; gray (2.5Y 6/1) moist, very fine sandy loam; moderate medium subangular blocky structure; friable; patchy distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 5 percent (common) brownish yellow (10YR 6/8), moist, masses of oxidized iron and 45 percent (many) olive yellow (2.5Y 6/6), moist, masses of oxidized iron; 1 percent (few) fine threadlike masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E3871.

BCtg --- 238 to 251 centimeters; gray (2.5Y 6/1) moist, very fine sandy loam; moderate medium subangular blocky structure; friable; patchy distinct clay films on vertical faces of peds; 1 percent (few) olive yellow (2.5Y 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E3872.

Cg --- 251 to 275 centimeters; light brownish gray (2.5Y 6/2) moist, stratified, fine sand; single grain; loose; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: fine sand; Lab sample # E3873.

PEDON DESCRIPTION

Pedon ID: S11TX2897004
Description Date: 4/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel between meander ridge and pimple mound.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Derly taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Typic Endoaqualfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’47.33888” north, 95°43’52.55852” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 0.1 percent
Elevation: 59.5 meters
Aspect: 207°
Drainage: Poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: SEPA10 - knotroot bristlegrass (*Setaria parviflora*); CAREX - sedge (*Carex*)
Parent Materials: alluvium
Particle Size Control Section: 39 to 89 centimeters
Diagnostic Features: Redox concentrations: 0 to 262 centimeters, Ochric epipedon: 0 to 39 centimeters, Reduced matrix: 23 to 296 centimeters, Aquic conditions: 23 to 296 centimeters, Argillic horizon: 39 to 218 centimeters, Redox depletions with chroma 2 or less: 60 to 125 centimeters, Redox depletions with chroma 2 or less: 146 to 173 centimeters and Redox depletions with chroma 2 or less: 194 to 218 centimeters

A --- 0 to 5 centimeters; dark grayish brown (10YR 4/2) moist, loam; weak fine subangular blocky and weak fine granular and weak medium granular structure; friable; many medium roots throughout and many fine roots throughout; 2 percent (common) very fine brownish yellow (10YR 6/6), moist, masses of oxidized iron; 1 percent unspecified fragments; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3874.

Ap --- 5 to 23 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay loam; moderate medium subangular blocky structure; friable; many medium roots throughout and many fine roots throughout; 1 percent (few) noncemented black (10YR 2/1), moist, iron-manganese masses and 15 percent (common) fine distinct strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3875.

BAg --- 23 to 39 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; common medium roots throughout and common fine roots throughout; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 25 percent (many) dark yellowish brown (10YR 4/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3876.

Btg1 --- 39 to 60 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; common medium roots throughout and common fine roots throughout; patchy distinct clay films on vertical faces of peds; 20 percent (many) fine distinct dark yellowish brown (10YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3877.

Btg2 --- 60 to 74 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; common medium roots throughout and common fine roots throughout; patchy distinct clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 1 percent (few) light brownish gray (10YR 6/2), moist, iron depletions, 1 percent (few) fine light olive brown (2.5Y 5/4), moist, iron-manganese concretions and 15 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.2, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3878.

Btg3 --- 74 to 98 centimeters; dark grayish brown (2.5Y 4/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; common fine roots and common medium roots; continuous distinct dark grayish brown (2.5Y 4/2), moist, clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) light olive brown (2.5Y 5/4), moist, iron depletions and 5 percent (common) fine distinct gray (10YR 6/1), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; Thin sand strata of less than 1cm vertical distance. and Field texture: clay; gradual smooth boundary; Lab sample # E3879.

Btg4 --- 98 to 125 centimeters; grayish brown (2.5Y 5/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; common fine roots and common medium roots; continuous distinct dark grayish brown (2.5Y 4/2), moist, clay films on all faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) light brownish gray (2.5Y 6/2), moist, iron depletions and 15 percent (common) medium light olive brown (2.5Y 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; Thin sand strata of less than 1cm vertical distance. and Field texture: clay; gradual smooth boundary; Lab sample # E3880.

Btg5 --- 125 to 146 centimeters; light brownish gray (2.5Y 6/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; common fine roots and common medium roots; patchy distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions, 5 percent (common) red (2.5YR 5/8), moist, masses of oxidized iron and 30 percent (many) light olive brown (2.5Y 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; Thin sand strata of less than 1cm vertical distance. and Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3881.

Btg6 --- 146 to 173 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few medium roots and common fine roots; patchy distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) medium gray (10YR 6/1), moist, iron depletions and 25 percent (many) medium distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3882.

Btg7 --- 173 to 194 centimeters; gray (10YR 6/1) moist, sandy clay loam; moderate medium subangular blocky structure; firm; moderately few medium roots and common fine roots; patchy distinct gray (10YR 5/1), moist, clay films on vertical faces of peds; 40 percent (many) medium brownish yellow (10YR 6/6), moist, masses of oxidized iron throughout; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3883.

Btg8 --- 194 to 218 centimeters; light brownish gray (2.5Y 6/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; patchy distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 20 percent (many) light gray (10YR 7/1), moist, iron depletions and 20 percent (many) light brownish gray (10YR 6/2), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3884.

BCg --- 218 to 262 centimeters; light brownish gray (2.5Y 6/2) moist, very fine sandy loam; weak medium subangular blocky structure; firm; moderately few coarse roots; 20 percent (many) medium distinct brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3885.

Cg --- 262 to 296 centimeters; light gray (10YR 7/1) moist, stratified, fine sand; single grain; loose; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Field texture: fine sand; Lab sample # E3886.

PEDON DESCRIPTION

Pedon ID: S11TX2897005
Description Date: 5/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine, smectitic, thermic Vertic Epiaqualfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’46.75878” north, 95°43’52.73048” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 0.1 percent
Elevation: 59.7 meters
Aspect: 207°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: BRAR5 - field brome (*Bromus arvensis*); NALE3 - Texas wintergrass (*Nassella leucotricha*); SEPA10 - knotroot bristlegrass (*Setaria parviflora*); RUBUS - blackberry (*Rubus*); HOPU - little barley (*Hordeum pusillum*); 2GA - annual grasses
Parent Materials: alluvium
Particle Size Control Section: 51 to 101 centimeters
Diagnostic Features: Redox concentrations: 0 to 275 centimeters, Aquic conditions: 0 to 275 centimeters, Ochric epipedon: 0 to 51 centimeters, Redox depletions with chroma 2 or less: 39 to 51 centimeters, Abrupt textural change: 51 centimeters (Restrictive layer), Episaturation: 51 to 69 centimeters, Reduced matrix: 51 to 69 centimeters, Argillic horizon: 51 to 230 centimeters, Slickensides: 69 to 99 centimeters, Redox depletions with chroma 2 or less: 69 to 99 centimeters, Secondary carbonates: 125 to 230 centimeters and Reduced matrix: 143 to 275 centimeters
Restrictions: Abrupt textural change: 51 centimeters

Ap --- 0 to 18 centimeters; dark brown (10YR 3/3) moist, fine sandy loam; moderate medium subangular blocky structure; friable; many fine roots; 1 percent (few) medium brown (7.5YR 4/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; neutral, pH 6.8, pH meter 1:1 water; clear smooth boundary; Lab sample # E3914.

A --- 18 to 39 centimeters; dark grayish brown (10YR 4/2) moist, fine sandy loam; moderate medium subangular blocky structure; friable; many fine roots; 1 percent (few) fine strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.6, pH meter 1:1 water; abrupt smooth boundary; Lab sample # E3915.

E --- 39 to 51 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak fine subangular blocky structure; very friable; common very fine roots and common fine roots; 5 percent (common) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron and 40 percent (many) coarse grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 7, pH meter 1:1 water; Field texture: loamy fine sand; abrupt smooth boundary; Lab sample # E3916.

Btg --- 51 to 69 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay; moderate medium angular blocky structure; very firm; common fine roots sand coats on vertical faces of peds and continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 40 percent (many) coarse strong brown (7.5YR 5/6), moist, masses of oxidized iron in matrix; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3917.

Btss --- 69 to 99 centimeters; pale brown (10YR 6/3) moist, clay; moderate medium angular blocky and moderate medium wedge structure; very firm; moderately few very fine roots and moderately few fine roots; distinct pressure faces on top faces of peds, slickensides (pedogenic) and continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly acid, pH 6.3, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E3918.

Bt --- 99 to 125 centimeters; pale brown (10YR 6/3) moist, clay; moderate medium angular blocky structure; very firm; moderately few very fine roots and moderately few fine roots; continuous distinct yellowish brown (10YR 5/6), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 20 percent (many) light yellowish brown (2.5Y 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E3919.

Btk --- 125 to 143 centimeters; pale brown (10YR 6/3) moist, sandy clay loam; moderate medium subangular blocky structure; firm; moderately few very fine roots and moderately few fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds and 2 percent (very few) discontinuous distinct light gray (10YR 7/2), moist, skeletans on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) fine strong brown (7.5YR 5/6), moist, masses of oxidized iron and 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) fine carbonate concretions and 1 percent (few) medium carbonate concretions; 2 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3920.

Btkg1 --- 143 to 183 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium subangular blocky structure; firm; moderately few very fine roots and moderately few fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 2 percent (common) black (10YR 2/1), moist, iron-manganese masses and 40 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) fine carbonate concretions, 2 percent (common) medium carbonate concretions and 4 percent (common) coarse carbonate concretions; 4 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: clay loam; gradual smooth boundary; Lab sample # E3921.

Btkg2 --- 183 to 212 centimeters; gray (10YR 6/1) moist, clay loam; weak medium subangular blocky structure; firm; moderately few very fine roots; continuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 2 percent (common) black (10YR 2/1), moist, iron-manganese masses and 30 percent (many) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) fine carbonate concretions and 2 percent (common) medium carbonate concretions; 1 percent carbonate concretions; noneffervescent by

HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3922.

Btkg3 --- 212 to 230 centimeters; light gray (2.5Y 7/2) moist, sandy clay loam; weak medium subangular blocky structure; firm; very few very fine roots; continuous distinct gray (5Y 6/1), moist, clay films on vertical faces of peds; 1 percent (few) noncemented black (10YR 2/1), moist, iron-manganese masses and 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) medium carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; clear smooth boundary; Lab sample # E3923.

CBg1 --- 230 to 244 centimeters; light gray (5Y 7/1) moist, clay loam; massive; firm; 2 percent (common) medium olive yellow (2.5Y 6/6), moist, masses of oxidized iron and 2 percent (common) medium strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3924.

CBg2 --- 244 to 259 centimeters; light gray (5Y 7/1) moist, sandy clay loam; massive; firm; 1 percent (few) medium prominent black (10YR 2/1), moist, iron-manganese masses throughout and 1 percent (few) medium prominent yellowish brown (10YR 5/6), moist, masses of oxidized iron throughout; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; clear smooth boundary; Lab sample # E3925.

Cg --- 259 to 275 centimeters; light gray (2.5Y 7/2) moist, stratified, fine sand; single grain; loose; 20 percent (many) medium prominent strong brown (7.5YR 5/6), moist, masses of oxidized iron throughout; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Lab sample # E3926.

PEDON DESCRIPTION

Pedon ID: S11TX2897006
Description Date: 5/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Summit of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine-loamy, siliceous, superactive, thermic Aquic Arenic Hapludalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’46.55621” north, 95°43’52.78791” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 0.1 percent
Elevation: 60 meters
Aspect: 207°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: BRAR5 - field brome (*Bromus arvensis*); NALE3 - Texas wintergrass (*Nassella leucotricha*); SEPA10 - knotroot bristlegrass (*Setaria parviflora*); RUBUS - blackberry (*Rubus*); HOPU - little barley (*Hordeum pusillum*); 2GA - annual grasses
Parent Materials: alluvium
Particle Size Control Section: 55 to 105 centimeters
Diagnostic Features: Ochric epipedon: 0 to 55 centimeters, Redox concentrations: 39 to 242 centimeters, Abrupt textural change: 55 centimeters (Restrictive layer), Redox depletions with chroma 2 or less: 55 to 111 centimeters, Aquic conditions: 55 to 285 centimeters, Argillic horizon: 55 to 242 centimeters, Secondary carbonates: 111 to 195 centimeters, Redox depletions with chroma 2 or less: 152 to 195 centimeters, Reduced matrix: 195 to 252 centimeters, Redox depletions with chroma 2 or less: 252 to 285 centimeters and Redox concentrations: 252 to 285 centimeters
Restrictions: Abrupt textural change: 55 centimeters

Ap --- 0 to 17 centimeters; brown (10YR 4/3) moist, loamy fine sand; weak medium subangular blocky structure; friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3927.

A --- 17 to 39 centimeters; brown (10YR 4/3) moist, loamy fine sand; moderate medium subangular blocky structure; friable; common fine roots; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3928.

E --- 39 to 55 centimeters; variegated 50 percent brown (10YR 5/3) moist and 50 percent pale brown (10YR 6/3) moist, loamy fine sand; weak medium subangular blocky structure; very friable; common fine roots and moderately few medium roots; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 1 percent (few) medium faint yellowish brown (10YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Field texture: fine sandy loam; abrupt smooth boundary; Lab sample # E3929.

Bt1 --- 55 to 74 centimeters; yellowish brown (10YR 5/4) moist, fine sandy loam; moderate medium subangular blocky structure; firm; moderately few fine roots and moderately few medium roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds and sand coats on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron, 5 percent (common) dark grayish brown (10YR 4/2), moist, iron depletions and 10 percent (common) medium distinct light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3930.

Bt2 --- 74 to 111 centimeters; light olive brown (2.5Y 5/3) moist, clay; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds and 15 percent (few) distinct pressure faces on top faces of peds; 7 percent (common) fine strong brown (7.5YR 5/6), moist, masses of oxidized iron, 8 percent (common) medium strong brown (7.5YR 5/6), moist, masses of oxidized iron and 5 percent (common) grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; clear smooth boundary; Lab sample # E3931.

Btk1 --- 111 to 141 centimeters; brown (10YR 5/3) moist, sandy clay loam; moderate medium angular blocky structure; very firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds and 10 percent (few) sand coats; 1 percent (few) strong brown (7.5YR 5/6), moist, masses of oxidized iron, 3 percent (common) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Field texture: sandy clay; clear smooth boundary; Lab sample # E3932.

Btk2 --- 141 to 152 centimeters; brown (10YR 5/3) moist, sandy clay loam; moderate medium subangular blocky structure; firm; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds and 40 percent (common) yellowish brown (10YR 5/4), moist, sand coats; 15 percent (common) medium strong brown (7.5YR 5/6), moist, masses of oxidized iron and 15 percent (common) fine strong brown (7.5YR 5/6), moist, masses of oxidized iron; 1 percent (few) masses of carbonate; 4 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; clear smooth boundary; Lab sample # E3933.

Btk3 --- 152 to 180 centimeters; light yellowish brown (2.5Y 6/3) moist, sandy clay; moderate medium subangular blocky structure; firm; continuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 15 percent (common) medium brownish yellow (10YR 6/6), moist, masses of oxidized iron, 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 15 percent (common) fine brownish yellow (10YR 6/6), moist, masses of oxidized iron, 10 percent (common) fine faint light brownish gray (10YR 6/2), moist, iron depletions and 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; 1 percent (few) coarse masses of carbonate; 2 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3934.

BCtk --- 180 to 195 centimeters; strong brown (7.5YR 5/6) moist, sandy clay loam; weak medium subangular blocky structure; firm; discontinuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 3 percent (common) black (10YR 2/1), moist, iron-manganese masses and 45 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; 1 percent (few) threadlike masses of carbonate and 1 percent (few) very coarse carbonate concretions; 3

percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter 1:1 water; clear smooth boundary; Lab sample # E3935.

BCtg --- 195 to 219 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak coarse platy and weak medium subangular blocky structure; firm; discontinuous distinct gray (10YR 6/1), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) threadlike masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter 1:1 water; clear smooth boundary; Lab sample # E3936.

CBtg --- 219 to 242 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak coarse platy and weak coarse subangular blocky structure; friable; discontinuous distinct gray (10YR 6/1), moist, clay films on vertical faces of peds; 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; abrupt smooth boundary; Lab sample # E3937.

Cg --- 242 to 252 centimeters; light gray (10YR 7/2) moist, stratified, loamy fine sand; single grain; loose; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: fine sand; abrupt smooth boundary; Lab sample # E3938.

C --- 252 to 285 centimeters; very pale brown (10YR 7/4) moist, stratified, fine sand; massive; very friable; 20 percent (many) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; Lab sample # E3939.

PEDON DESCRIPTION

Pedon ID: S11TX2897007
Description Date: 5/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine-loamy, siliceous, superactive, thermic Oxyaquic Vertic Glossudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24'46.36596" north, 95°43'52.8419" west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 0.1 percent
Elevation: 60 meters
Aspect: 207°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: BRAR5 - field brome (*Bromus arvensis*); NALE3 - Texas wintergrass (*Nassella leucotricha*); SEPA10 - knotroot bristlegrass (*Setaria parviflora*); RUBUS - blackberry (*Rubus*); HOPU - little barley (*Hordeum pusillum*); 2GA - annual grasses
Parent Materials: alluvium
Particle Size Control Section: 31 to 81 centimeters
Diagnostic Features: Ochric epipedon: 0 to 31 centimeters, Redox concentrations: 21 to 87 centimeters, Aquic conditions: 31 to 280 centimeters, Glossic horizon: 31 to 48 centimeters, Argillic horizon: 31 to 186 centimeters, Slickensides: 87 to 143 centimeters, Episaturation: 87 to 87 centimeters, Redox depletions with chroma 2 or less: 120 to 186 centimeters, Redox concentrations: 120 to 262 centimeters, Reduced matrix: 165 to 280 centimeters and Secondary carbonates: 186 to 239 centimeters

Ap --- 0 to 21 centimeters; dark grayish brown (10YR 4/2) moist, loamy fine sand; weak medium subangular blocky structure; friable; moderately few very fine roots and common fine roots; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3940.

A --- 21 to 31 centimeters; brown (10YR 5/3) moist, fine sandy loam; weak medium subangular blocky structure; friable; moderately few very fine roots and common fine roots; 5 percent (common) faint yellowish brown (10YR 5/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; clear smooth boundary; Lab sample # E3941.

B/Et --- 31 to 48 centimeters; pale brown (10YR 6/3) moist and; brown (10YR 5/3) moist, fine sandy loam; moderate medium subangular blocky structure; firm; common medium roots, moderately few very fine roots and common fine roots; patchy distinct brown (10YR 5/3), moist, clay films on all faces of peds; 10 percent (common) medium distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: sandy clay loam & loamy fine sand; clear irregular boundary; Lab sample # E3942.

Bt1 --- 48 to 66 centimeters; brown (10YR 5/3) moist, sandy clay loam; moderate medium angular blocky structure; very firm; moderately few very fine roots; discontinuous distinct brown (10YR 5/3), moist, clay films on all faces of peds; 10 percent (common) medium distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3943.

Bt2 --- 66 to 87 centimeters; light yellowish brown (2.5Y 6/3) moist, clay; weak coarse subangular blocky structure; very firm, very sticky, very plastic; moderately few fine roots and moderately few very fine roots; 20 percent (many) fine light yellowish brown (2.5Y 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; Field texture: sandy clay and water saturated; clear smooth boundary; Lab sample # E3944.

Btss --- 87 to 120 centimeters; light yellowish brown (2.5Y 6/3) moist, clay; moderate medium angular blocky and moderate medium wedge structure; very firm; moderately few very fine roots and moderately few fine roots slickensides (pedogenic), continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds and 1 percent (very few) skeletans on vertical faces of peds; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3945.

Btssg --- 120 to 143 centimeters; light brownish gray (2.5Y 6/2) moist, sandy clay; moderate medium angular blocky and moderate medium wedge structure; very firm; continuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds and slickensides (pedogenic); 5 percent (common) gray (2.5Y 6/1), moist, iron depletions and 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3946.

B't --- 143 to 165 centimeters; light yellowish brown (2.5Y 6/3) moist, sandy clay; moderate medium subangular blocky structure; very firm; very few fine roots and very few medium roots; discontinuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 25 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 25 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3947.

Btg --- 165 to 186 centimeters; light brownish gray (2.5Y 6/2) moist, sandy clay; moderate medium subangular blocky structure; very firm; very few very fine roots; continuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 5 percent (common) gray (10YR 6/1), moist, iron depletions and 30 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3948.

BCkg --- 186 to 205 centimeters; gray (2.5Y 6/1) moist, sandy clay loam; weak medium subangular blocky structure; firm; 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; 2 percent (common) masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3949.

CBkg --- 205 to 239 centimeters; gray (2.5Y 6/1) moist, fine sandy loam; weak medium subangular blocky structure; firm; 3 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; 2 percent (common) threadlike masses of carbonate and 3 percent (common) masses of carbonate; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3950.

Cg1 --- 239 to 262 centimeters; light gray (2.5Y 7/1) moist, stratified, fine sandy loam; massive; very friable; 1 percent (few) light yellowish brown (2.5Y 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E3951.

Cg2 --- 262 to 280 centimeters; light gray (2.5Y 7/1) moist, stratified, very fine sandy loam; single grain; very friable; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter 1:1 water; Field texture: fine sand; Lab sample # E3952.

PEDON DESCRIPTION

Pedon ID: S11TX2897008
Description Date: 5/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel adjacent to pimple mound.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Derly taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Typic Argiaquolls
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24'46.04169" north, 95°43'52.7899" west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 0.1 percent
Elevation: 59.5 meters
Aspect: 207°
Drainage: Poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: SEPA10 - knotroot bristlegrass (*Setaria parviflora*); CAREX - sedge (*Carex*)
Parent Materials: alluvium
Particle Size Control Section: 39 to 89 centimeters
Diagnostic Features: Aquic conditions: 0 to 230 centimeters, Redox concentrations: 0 to 230 centimeters, Mollic epipedon: 0 to 39 centimeters, Reduced matrix: 39 to 230 centimeters, Argillic horizon: 39 to 191 centimeters, Secondary carbonates: 102 to 132 centimeters, Redox depletions with chroma 2 or less: 132 to 157 centimeters and Redox depletions with chroma 2 or less: 175 to 191 centimeters

Ap --- 0 to 19 centimeters; very dark grayish brown (10YR 3/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm, moderately hard; common very fine roots and common fine roots; 20 percent (many) fine dark yellowish brown (10YR 4/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; clear smooth boundary; Lab sample # E3953.

A --- 19 to 39 centimeters; very dark grayish brown (10YR 3/2) moist, rubbed and; dark grayish brown (10YR 4/2) moist, clay loam; moderate medium subangular blocky structure; firm, moderately hard; common very fine roots and common fine roots; 10 percent (common) brown (10YR 5/3), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3954.

Btg1 --- 39 to 58 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay loam; weak medium angular blocky structure; very firm; common very fine roots; patchy distinct dark grayish brown (10YR 4/2), moist, clay films on vertical faces of peds and 1 percent (very few) skeletans; 15 percent (common) yellowish brown (10YR 5/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3955.

Btg2 --- 58 to 78 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; common very fine roots; continuous distinct dark grayish brown (10YR 4/2), moist, clay films on all faces of peds and 1 percent (very few) skeletans; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3956.

Btg3 --- 78 to 102 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; moderately few very fine roots; continuous distinct dark grayish brown (10YR 4/2), moist, clay films on all faces of peds and 1 percent (very few) skeletans; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) fine yellowish brown (10YR 5/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3957.

Btkg --- 102 to 132 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; moderate medium angular blocky structure; firm; moderately few very fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on all faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 30 percent (many) medium distinct brownish yellow (10YR 6/6), moist, masses of oxidized iron; 3 percent (common) medium carbonate concretions; 3 percent carbonate concretions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3958.

B'tg1 --- 132 to 157 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; firm; moderately few very fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on all faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 25 percent (many) yellowish brown (10YR 5/4), moist, iron-manganese masses and 10 percent (common) gray (10YR 6/1), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3959.

B'tg2 --- 157 to 175 centimeters; light gray (10YR 7/1) moist, clay loam; moderate medium subangular blocky structure; firm; moderately few very fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 40 percent (many) medium prominent yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E3960.

B'tg3 --- 175 to 191 centimeters; brownish yellow (10YR 6/6) moist, fine sandy loam; weak medium subangular blocky structure; firm; continuous distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 40 percent (many) light gray (10YR 7/1), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3961.

Cg --- 191 to 230 centimeters; light gray (10YR 7/2) moist, stratified, fine sand; single grain; loose; 5 percent (common) coarse yellow (10YR 7/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Lab sample # E3962.

PEDON DESCRIPTION

Pedon ID: S11TX2897009
Description Date: 5/12/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: Low T-1 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel adjacent to meander ridge.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Yeaton
Classification: Fine-loamy, siliceous, active, thermic Aquic Hapludalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-D6 - Stanmire Lake, Texas
Lat/Long: 31°24’48.20239” north, 95°43’51.95914” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 0.1 percent
Elevation: 59.5 meters
Aspect: 207°
Drainage: Poorly drained
Erosion: None - deposition
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: SEPA10 - knotroot bristlegrass (*Setaria parviflora*); CAREX - sedge (*Carex*)
Parent Materials: alluvium
Particle Size Control Section: 55 to 105 centimeters
Diagnostic Features: Aquic conditions: 0 to 239 centimeters, Redox concentrations: 0 to 16 centimeters, Ochric epipedon: 0 to 55 centimeters, Redox depletions with chroma 2 or less: 16 to 36 centimeters, Redox concentrations: 36 to 100 centimeters, Redox depletions with chroma 2 or less: 55 to 141 centimeters, Argillic horizon: 55 to 173 centimeters, Reduced matrix: 76 to 239 centimeters and Redox concentrations: 118 to 239 centimeters

Ap --- 0 to 16 centimeters; brown (10YR 4/3) moist, sandy clay loam; moderate medium angular blocky structure; firm; moderately few very fine roots and moderately few fine roots; 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 25 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; clear smooth boundary; Lab sample # E3963.

A --- 16 to 36 centimeters; dark grayish brown (10YR 4/2) moist, sandy clay loam; moderate medium angular blocky structure; firm; moderately few very fine roots and moderately few fine roots; 5 percent (common) faint grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3964.

AB --- 36 to 55 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; moderately few fine roots; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; clear smooth boundary; Lab sample # E3965.

Bt --- 55 to 76 centimeters; brown (10YR 4/3) moist, sandy clay loam; moderate fine angular blocky and moderate medium angular blocky structure; very firm; moderately few fine roots between peds; continuous distinct brown (10YR 4/3), moist, clay films on vertical faces of peds; 4 percent (common) grayish brown (10YR 5/2), moist, iron depletions and 25 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3966.

Btg --- 76 to 100 centimeters; grayish brown (10YR 5/2) moist, sandy clay loam; moderate medium angular blocky structure; firm; very few fine roots between peds grayish brown (10YR 5/2), moist, sand coats on vertical faces of peds and patchy distinct brown (10YR 4/3), moist, clay films on vertical faces of peds; 3 percent (common) gray (10YR 6/1), moist, iron depletions and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3967.

B't --- 100 to 118 centimeters; red (2.5YR 5/6) moist, sandy clay loam; moderate medium angular blocky structure; very firm; very few fine roots between peds grayish brown (10YR 5/2), moist, sand coats on vertical faces of peds and continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 20 percent (many) light brownish gray (2.5Y 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E3968.

B'tg --- 118 to 141 centimeters; grayish brown (2.5Y 5/2) moist, sandy clay loam; moderate medium angular blocky structure; firm; very few fine roots between peds; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) light brownish gray (2.5Y 6/2), moist, iron depletions and 20 percent (many) medium prominent yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3969.

BCtg --- 141 to 173 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak medium subangular blocky structure; firm; very few fine roots between peds; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 10 percent (common) coarse yellowish brown (10YR 5/6), moist, masses of oxidized iron in matrix and 10 percent (common) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron in matrix; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3970.

CBg --- 173 to 201 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak coarse subangular blocky structure; friable; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) light olive brown (2.5Y 5/3), moist, iron-manganese masses, 10 percent (common) coarse yellowish brown (10YR 5/6), moist, masses of oxidized iron in matrix and 10 percent (common) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron in matrix; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3971.

Cg1 --- 201 to 226 centimeters; light brownish gray (10YR 6/2) moist, stratified, loamy fine sand; massive; very friable; 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water;

Field texture: fine sand & loamy fine sand and 5cm thickness of loamy fine sand from 221 to 226cm; clear smooth boundary; Lab sample # E3972.

Cg2 --- 226 to 239 centimeters; light gray (10YR 7/2) moist, stratified, loamy fine sand; single grain; loose; 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.2, pH meter 1:1 water; Field texture: fine sand; Lab sample # E3973.

PEDON DESCRIPTION

Pedon ID: S11TX2897010
Description Date: 5/16/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-1 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel between pimple mounds.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Derly taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Aquic Glossudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°11’24.30138” north, 95°45’12.05856” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1 percent
Elevation: 54.4 meters
Aspect: 113°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: LOLIU - ryegrass (*Lolium*); BRAR5 - field brome (*Bromus arvensis*); CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); TRFL2 - purpletop tridens (*Tridens flavus*); RUMEX - dock (*Rumex*); DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); CAREX - sedge (*Carex*)
Parent Materials: alluvium
Particle Size Control Section: 14 to 64 centimeters
Diagnostic Features: Redox concentrations: 0 to 316 centimeters, Ochric epipedon: 0 to 14 centimeters, Glossic horizon: 14 to 32 centimeters, Argillic horizon: 14 to 213 centimeters, Redox depletions with chroma 2 or less: 32 to 59 centimeters, Redox depletions with chroma 2 or less: 96 to 133 centimeters, Redox depletions with chroma 2 or less: 162 to 213 centimeters and Redox depletions with chroma 2 or less: 236 to 263 centimeters

Ap --- 0 to 14 centimeters; grayish brown (10YR 5/2) moist, loam; weak fine subangular blocky structure; friable; common medium roots throughout, common very fine roots throughout and common fine roots throughout; 25 percent (many) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; Field texture: very fine sandy loam; abrupt smooth boundary; Lab sample # E3984.

Bt/E --- 14 to 32 centimeters; yellowish brown (10YR 5/4) moist, loam; moderate medium subangular blocky structure; firm; common fine roots and moderately few coarse roots; 5 percent (common) faint brown (10YR 5/3), moist, iron depletions and 20 percent (many) faint yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: sandy clay loam; clear irregular boundary; Lab sample # E3985.

Bt1 --- 32 to 59 centimeters; brown (10YR 5/3) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; 3 percent (very few) discontinuous distinct grayish brown (10YR 5/2), moist, skeletans on all faces of peds and discontinuous distinct dark grayish brown (10YR 4/2), moist, clay films on vertical faces of peds; 1 percent (few) black

(10YR 2/1), moist, iron-manganese masses, 5 percent (common) distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron and 5 percent (common) fine light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E3986.

Bt2 --- 59 to 96 centimeters; brown (10YR 5/3) moist, clay loam; moderate medium subangular blocky structure; firm; moderately few very fine roots and moderately few fine roots; 5 percent (few) discontinuous distinct brown (10YR 5/3), moist, skeletans on all faces of peds and discontinuous distinct brown (10YR 4/3), moist, clay films on vertical faces of peds; 2 percent (common) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3987.

Bt3 --- 96 to 133 centimeters; yellowish brown (10YR 5/4) moist, very fine sandy loam; moderate medium subangular blocky structure; firm; moderately few very fine roots; 10 percent (few) continuous distinct brown (10YR 5/3), moist, skeletans on all faces of peds and continuous distinct brown (10YR 4/3), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) dark yellowish brown (10YR 4/4), moist, iron-manganese masses and 5 percent (common) fine distinct grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3988.

Bt4 --- 133 to 162 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) dark yellowish brown (10YR 4/4), moist, iron-manganese masses, 3 percent (common) faint brown (7.5YR 5/4), moist, masses of oxidized iron and 15 percent (common) medium distinct brown (10YR 5/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E3989.

Bt5 --- 162 to 190 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 1 percent (few) strong brown (7.5YR 5/8), moist, masses of oxidized iron, 2 percent (common) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E3990.

Bt6 --- 190 to 213 centimeters; yellowish brown (10YR 5/4) moist, sandy clay loam; weak medium subangular blocky structure; firm; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) distinct light brownish gray (10YR 6/2), moist, iron depletions and 35 percent (many) faint yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; clear smooth boundary; Lab sample # E3991.

BC --- 213 to 236 centimeters; brownish yellow (10YR 6/6) moist, stratified, very fine sandy loam; weak coarse subangular blocky structure; friable; 30 percent (many) brown (10YR 5/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E3992.

C1 --- 236 to 263 centimeters; 40 percent yellowish brown (10YR 5/4) moist and 30 percent brownish yellow (10YR 6/6) moist, stratified, clay loam very fine sandy loam; massive; friable; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 20 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E3993.

C2 --- 263 to 316 centimeters; 55 percent brownish yellow (10YR 6/6) moist and 40 percent pale brown (10YR 6/3) moist, stratified, very fine sandy loam fine sand; single grain and massive; friable; 5 percent (common) brownish yellow (10YR 6/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.5, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E3994.

C3 --- 316 to 336 centimeters; very pale brown (10YR 7/3) moist, stratified, fine sand; single grain; loose; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Lab sample # E3995.

PEDON DESCRIPTION

Pedon ID: S11TX2897011
Description Date: 5/16/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-1 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine, smectitic, thermic Haplic Glossudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°11’24.09168” north, 95°45’12.20274” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1 percent
Elevation: 54.7 meters
Aspect: 113°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: BRAR5 - field brome (*Bromus arvensis*); DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); CYDA - Bermudagrass (*Cynodon dactylon*); LOLIU - ryegrass (*Lolium*); 2GA - annual grasses; RUBUS - blackberry (*Rubus*); AMPS - western ragweed (*Ambrosia psilostachya*)
Parent Materials: alluvium
Particle Size Control Section: 39 to 89 centimeters
Diagnostic Features: Redox concentrations: 0 to 18 centimeters, Ochric epipedon: 0 to 39 centimeters, Abrupt textural change: 39 centimeters (Restrictive layer), Glossic horizon: 39 to 46 centimeters, Argillic horizon: 39 to 244 centimeters, Redox depletions with chroma 2 or less: 46 to 132 centimeters, Redox concentrations: 61 to 91 centimeters, Secondary carbonates: 91 to 163 centimeters, Redox concentrations: 132 to 208 centimeters, Redox depletions with chroma 2 or less: 197 to 244 centimeters and Redox concentrations: 222 to 312 centimeters
Restrictions: Abrupt textural change: 39 centimeters

Ap --- 0 to 18 centimeters; brown (10YR 4/3) moist, very fine sandy loam; weak fine subangular blocky structure; friable; common fine roots, common coarse roots and common medium roots; 1 percent (few) faint yellowish brown (10YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3996.

E --- 18 to 39 centimeters; brown (7.5YR 5/4) moist, very fine sandy loam; light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E3997.

Bt/E --- 39 to 46 centimeters; 60 percent yellowish red (5YR 4/6) moist and 40 percent brown (7.5YR 5/4) moist, sandy clay loam; moderate medium subangular blocky structure; friable; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; clear smooth boundary; Lab sample # E3998.

Bt1 --- 46 to 61 centimeters; red (2.5YR 4/6) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; 10 percent (few) distinct pressure faces on top faces of peds and continuous distinct clay films on vertical faces of peds; 25 percent (many) medium brown (7.5YR 5/3), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; clear smooth boundary; Lab sample # E3999.

Bt2 --- 61 to 91 centimeters; yellowish red (5YR 4/6) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; 10 percent (few) distinct pressure faces on top faces of peds and continuous distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 25 percent (many) medium pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4000.

Btk1 --- 91 to 132 centimeters; strong brown (7.5YR 4/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; moderately few fine roots and very few medium roots; continuous distinct clay films on vertical faces of peds; 5 percent (common) yellowish brown (10YR 5/4), moist, iron depletions; 1 percent (few) coarse moderately cemented carbonate nodules; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4001.

Btk2 --- 132 to 163 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; very few fine roots; discontinuous distinct yellowish brown (10YR 5/6), moist, clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses; 1 percent (few) coarse moderately cemented carbonate nodules; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4002.

B't1 --- 163 to 197 centimeters; brownish yellow (10YR 6/6) moist, very fine sandy loam; weak medium subangular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 1 percent (few) very dark gray (10YR 3/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4003.

B't2 --- 197 to 208 centimeters; yellowish brown (10YR 5/6) moist, clay loam; weak medium subangular blocky structure; firm; patchy distinct light reddish brown (2.5YR 6/3), moist, clay films on vertical faces of peds; 1 percent (few) very dark gray (10YR 3/1), moist, iron-manganese masses, 10 percent (common) faint brownish yellow (10YR 6/6), moist, masses of oxidized iron and 15 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4004.

BCt --- 208 to 222 centimeters; light yellowish brown (10YR 6/4) moist, sandy clay loam; weak coarse subangular blocky structure; friable; patchy distinct clay films on vertical faces of peds; 5 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Field texture: very fine sandy loam; clear smooth boundary; Lab sample # E4005.

CBt --- 222 to 244 centimeters; 54 percent yellowish brown (10YR 5/6) moist and 35 percent brownish yellow (10YR 6/6) moist, stratified, loam fine sandy loam; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) light brownish gray (10YR

6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.5, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4006.

C1 --- 244 to 266 centimeters; 90 percent pale brown (10YR 6/3) moist and 10 percent very pale brown (10YR 7/3) moist, stratified, very fine sandy loam; massive; friable; 25 percent (many) light yellowish brown (10YR 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4007.

C2 --- 266 to 312 centimeters; 80 percent light gray (10YR 7/2) moist and 20 percent yellow (10YR 7/6) moist, stratified, very fine sandy loam very fine sandy loam; single grain; loose; 1 percent (few) light yellowish brown (2.5Y 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly alkaline, pH 9.1, pH meter 1:1 water; Field texture: fine sand; gradual smooth boundary; Lab sample # E4008.

C3 --- 312 to 330 centimeters; 80 percent very pale brown (10YR 7/3) moist, 10 percent pale yellow (2.5Y 7/4) moist and 10 percent light gray (10YR 7/2) moist, stratified, loamy fine sand sandy clay loam; single grain; loose; noneffervescent by HCl, 1 normal; very strongly alkaline, pH 9.1, pH meter 1:1 water; Field texture: fine sand; Lab sample # E4009.

PEDON DESCRIPTION

Pedon ID: S11TX2897012
Description Date: 5/16/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-1 terrace of the Trinity River system.
Pedon Notes: Text: Summit of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Gallime
Classification: Coarse-loamy, siliceous, active, thermic Glossic Paleudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°11’23.89165” north, 95°45’12.34337” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1 percent
Elevation: 55.1 meters
Aspect: 113°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: BRAR5 - field brome (*Bromus arvensis*); RUBUS - blackberry (*Rubus*); AMPS - western ragweed (*Ambrosia psilostachya*); DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); CYDA - Bermudagrass (*Cynodon dactylon*); 2GA - annual grasses; LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 25 to 100 centimeters
Diagnostic Features: Ochric epipedon: 0 to 94 centimeters, Redox concentrations: 19 to 42 centimeters, Redox concentrations: 67 to 264 centimeters, Redox depletions with chroma 2 or less: 94 to 150 centimeters, Glossic horizon: 94 to 113 centimeters, Abrupt textural change: 113 centimeters (Restrictive layer), Argillic horizon: 113 to 295 centimeters and Redox depletions with chroma 2 or less: 264 to 295 centimeters
Restrictions: Abrupt textural change: 113 centimeters

Ap --- 0 to 19 centimeters; brown (10YR 4/3) moist, very fine sandy loam; weak fine subangular blocky structure; friable; common fine roots, moderately few medium roots and moderately few coarse roots; 1 percent unspecified fragments; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4010.

E1 --- 19 to 42 centimeters; dark yellowish brown (10YR 4/4) moist, very fine sandy loam; weak medium subangular blocky structure; friable; common fine roots and moderately few medium roots; 1 percent (few) medium spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions; 1 percent unspecified fragments; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4011.

E2 --- 42 to 67 centimeters; yellowish brown (10YR 5/4) moist, very fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; 1 percent unspecified fragments; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4012.

E3 --- 67 to 94 centimeters; brown (7.5YR 5/4) moist, very fine sandy loam; weak medium subangular blocky structure; friable; moderately few fine roots; 1 percent (few) medium spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions; 1 percent unspecified fragments; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4013.

E/Bt --- 94 to 113 centimeters; 60 percent yellowish brown (10YR 5/4) moist and 40 percent yellowish brown (10YR 5/6) moist, very fine sandy loam; moderate medium subangular blocky structure; friable; moderately few fine roots; 2 percent (common) medium spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions and 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: fine sandy loam; gradual irregular boundary; Lab sample # E4014.

Bt1 --- 113 to 150 centimeters; variegated yellowish brown (10YR 5/4) moist, clay; moderate medium angular blocky structure; very firm; very few fine roots; continuous distinct clay films on all faces of peds; 20 percent (many) grayish brown (10YR 5/2), moist, iron depletions, 20 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 30 percent (many) red (2.5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4015.

Bt2 --- 150 to 190 centimeters; variegated yellowish red (5YR 5/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; continuous distinct yellowish brown (10YR 5/4), moist, clay films on all faces of peds; 10 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron, 10 percent (common) light red (2.5YR 6/6), moist, masses of oxidized iron and 40 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4016.

Bt3 --- 190 to 212 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 3 percent (common) faint strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4017.

Bt4 --- 212 to 240 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; weak medium subangular blocky structure; firm; continuous distinct pale brown (10YR 6/3), moist, clay films on all faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 5 percent (common) light yellowish brown (10YR 6/4), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4018.

BCt --- 240 to 264 centimeters; brownish yellow (10YR 6/6) moist, very fine sandy loam; weak coarse subangular blocky structure; friable; patchy distinct clay films; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 3 percent (common) faint pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4019.

CBt --- 264 to 295 centimeters; brownish yellow (10YR 6/6) moist, stratified, very fine sandy loam; weak coarse subangular blocky structure; friable; patchy distinct clay films; 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 3 percent (common) very pale brown (10YR 7/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4020.

C1 --- 295 to 319 centimeters; yellow (10YR 7/6) moist, stratified, very fine sandy loam; massive; friable; 4 percent (common) light yellowish brown (10YR 6/4), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.6, pH meter 1:1 water; Field texture: loamy fine sand & fine sand and Alternating bedding planes of loamy fine sand (70%) and fine sand (30%).; gradual smooth boundary; Lab sample # E4021.

C2 --- 319 to 340 centimeters; very pale brown (10YR 7/3) moist, stratified, loamy fine sand; single grain; very friable; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.9, pH meter 1:1 water; Field texture: fine sand & loamy fine sand and Alternating bedding planes of fine sand (80%) and loamy fine sand (20%).; Lab sample # E4022.

PEDON DESCRIPTION

Pedon ID: S11TX2897013
Description Date: 5/16/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-1 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine-loamy, siliceous, superactive, thermic Haplic Glossudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°11'23.62053" north, 95°45'12.53364" west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1 percent
Elevation: 54.5 meters
Aspect: 113°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: BRAR5 - field brome (*Bromus arvensis*); RUBUS - blackberry (*Rubus*); AMPS - western ragweed (*Ambrosia psilostachya*); DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); CYDA - Bermudagrass (*Cynodon dactylon*); 2GA - annual grasses; LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 66 to 116 centimeters
Diagnostic Features: Redox concentrations: 0 to 263 centimeters, Ochric epipedon: 0 to 66 centimeters, Glossic horizon: 66 to 101 centimeters, Argillic horizon: 66 to 263 centimeters, Slickensides: 128 to 159 centimeters, Secondary carbonates: 159 to 218 centimeters, Redox depletions with chroma 2 or less: 242 to 263 centimeters and Secondary carbonates: 242 to 263 centimeters

Ap --- 0 to 20 centimeters; brown (10YR 4/3) moist, very fine sandy loam; weak medium subangular blocky structure; friable; common fine roots and common medium roots; 1 percent (few) spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions and 5 percent (common) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4023.

E1 --- 20 to 39 centimeters; brown (10YR 5/3) moist, very fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots and common medium roots; 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4024.

E2 --- 39 to 66 centimeters; brown (10YR 5/3) moist, very fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots and common medium roots; 1 percent (few) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4025.

Bt/E --- 66 to 101 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium subangular blocky structure; firm; common fine roots; 5 percent (common) brown (10YR 5/3), moist, iron depletions and 10 percent (common) faint yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; Field texture: sandy clay loam; clear irregular boundary; Lab sample # E4026.

Bt --- 101 to 128 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky structure; firm; common fine roots and moderately few medium roots; patchy distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 1 percent (few) spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions, 2 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 4 percent (common) brown (10YR 5/3), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E4027.

Btss --- 128 to 159 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky and moderate medium wedge structure; very firm; moderately few fine roots slickensides (pedogenic), patchy distinct light yellowish brown (10YR 6/4), moist, skeletans on vertical faces of peds and patchy distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 1 percent (few) medium spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions and 2 percent (common) faint brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4028.

Btk1 --- 159 to 189 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium subangular blocky structure; firm; very few fine roots light yellowish brown (10YR 6/4), moist, skeletans on vertical faces of peds and patchy distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 1 percent (few) medium spherical moderately cemented black (10YR 2/1), moist, iron-manganese concretions and 2 percent (common) faint brownish yellow (10YR 6/6), moist, masses of oxidized iron; 2 percent (common) coarse strongly cemented carbonate nodules; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4029.

Btk2 --- 189 to 218 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; 1 percent (very few) skeletans on vertical faces of peds and patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) pale brown (10YR 6/3), moist, iron depletions and 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; 2 percent (common) coarse carbonate nodules; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4030.

B't --- 218 to 242 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) pale brown (10YR 6/3), moist, iron depletions and 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4031.

BCtk --- 242 to 263 centimeters; brownish yellow (10YR 6/6) moist, very fine sandy loam; weak coarse subangular blocky structure; friable; patchy distinct clay films on vertical faces of peds; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 20 percent (many) faint brownish yellow (10YR 6/8), moist, masses of oxidized iron; 1 percent (few) threadlike strongly cemented carbonate nodules; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.5, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4032.

CB --- 263 to 305 centimeters; 60 percent very pale brown (10YR 7/3) moist and 40 percent yellow (10YR 7/6) moist, stratified, very fine sandy loam; weak coarse subangular blocky structure; friable; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.5, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4033.

C1 --- 305 to 365 centimeters; 70 percent very pale brown (10YR 7/3) moist and 30 percent yellow (10YR 7/6) moist, stratified, loamy fine sand; single grain; loose; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.8, pH meter 1:1 water; Field texture: fine sand; gradual smooth boundary; Lab sample # E4034.

C2 --- 365 to 375 centimeters; 60 percent yellow (10YR 7/6) moist and 40 percent very pale brown (10YR 7/3) moist, stratified, fine sand; massive; very friable; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.6, pH meter 1:1 water; Lab sample # E4035.

PEDON DESCRIPTION

Pedon ID: S11TX2897014
Description Date: 5/16/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-1 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel between pimple mound and meander ridge.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Yeaton
Classification: Fine, smectitic, thermic Aquic Hapludalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°11’23.32642” north, 95°45’12.7245” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1 percent
Elevation: 54.2 meters
Aspect: 113°
Drainage: Poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); LOLIU - ryegrass (*Lolium*); TRFL2 - purpletop tridens (*Tridens flavus*); HOPU - little barley (*Hordeum pusillum*); CAREX - sedge (*Carex*); CYDA - Bermudagrass (*Cynodon dactylon*)
Parent Materials: alluvium
Particle Size Control Section: 18 to 68 centimeters
Diagnostic Features: Aquic conditions: 0 to 310 centimeters, Redox concentrations: 0 to 310 centimeters, Ochric epipedon: 0 to 18 centimeters, Redox depletions with chroma 2 or less: 18 to 32 centimeters, Argillic horizon: 18 to 244 centimeters, Reduced matrix: 32 to 98 centimeters, Redox depletions with chroma 2 or less: 53 to 180 centimeters, Secondary carbonates: 98 to 206 centimeters, Reduced matrix: 180 to 275 centimeters, Redox depletions with chroma 2 or less: 206 to 244 centimeters, Redox depletions with chroma 2 or less: 275 to 310 centimeters and Secondary carbonates: 275 to 310 centimeters

Ap --- 0 to 18 centimeters; brown (10YR 5/3) moist, loam; pale brown (10YR 6/3) dry; moderate thick platy parting to moderate medium subangular blocky structure; friable, hard; common medium roots and common fine roots; 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; abrupt smooth boundary; Lab sample # E4036.

Bt --- 18 to 32 centimeters; brown (10YR 5/3) moist, clay loam; pale brown (10YR 6/3) dry; moderate medium subangular blocky structure; very firm; common medium roots and common fine roots; patchy distinct clay films on vertical faces of peds; 2 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E4037.

Btg1 --- 32 to 53 centimeters; grayish brown (10YR 5/2) moist, clay loam; light brownish gray (10YR 6/2) dry; moderate coarse angular blocky structure; very firm; moderately few medium roots and common fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 1 percent (few) light yellowish brown

(10YR 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4038.

Btg2 --- 53 to 82 centimeters; grayish brown (10YR 5/2) moist, clay loam; light brownish gray (10YR 6/2) dry; moderate medium angular blocky structure; very firm; moderately few fine roots; 1 percent (very few) patchy distinct light brownish gray (10YR 6/2), moist, skeletans on vertical faces of peds, patchy distinct pressure faces on top faces of peds and patchy distinct clay films on vertical faces of peds; 1 percent (few) yellowish brown (10YR 5/6), moist, masses of oxidized iron, 5 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 10 percent (common) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4039.

Btg3 --- 82 to 98 centimeters; grayish brown (10YR 5/2) moist, clay loam; light brownish gray (10YR 6/2) dry; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) noncemented black (10YR 2/1), moist, iron-manganese masses, 1 percent (few) light brownish gray (10YR 6/2), moist, iron depletions and 3 percent (common) light olive brown (2.5Y 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.8, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4040.

Btk1 --- 98 to 119 centimeters; brown (10YR 5/3) moist, clay; pale brown (10YR 6/3) dry; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 5 percent (common) grayish brown (10YR 5/2), moist, iron depletions; 2 percent (common) medium carbonate nodules; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E4041.

Btk2 --- 119 to 148 centimeters; light olive brown (2.5Y 5/3) moist, clay; weak medium angular blocky structure; firm; moderately few fine roots; 1 percent (very few) patchy distinct light brownish gray (10YR 6/2), moist, skeletans on vertical faces of peds and patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions, 4 percent (common) light olive brown (2.5Y 5/4), moist, masses of oxidized iron and 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; 2 percent (common) medium carbonate nodules; krotovinas; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; Field texture: sandy clay loam and Krotovinas (10YR 6/2) 10mm diameter.; gradual smooth boundary; Lab sample # E4042.

Btk3 --- 148 to 180 centimeters; variegated light yellowish brown (2.5Y 6/3) moist, sandy clay loam; weak medium angular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 2 percent (common) black (10YR 2/1), moist, iron-manganese masses, 30 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 30 percent (many) pale red (2.5YR 7/2), moist, iron depletions; 1 percent (few) medium carbonate nodules; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter 1:1 water; Krotovinas (10YR 6/2) 10mm diameter.; gradual smooth boundary; Lab sample # E4043.

Btkg --- 180 to 206 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak coarse subangular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) brown (10YR 5/3), moist, masses of oxidized iron and 40 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) medium carbonate nodules; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4044.

B'tg --- 206 to 244 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak coarse subangular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 2 percent (common) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) yellowish brown (10YR 5/6), moist, iron depletions and 30 percent (many) light gray (10YR 7/2), moist, masses of oxidized iron; 5 percent (common) medium prominent dendritic weakly cemented black (10YR 2/1), moist, root sheaths with sharp boundaries on vertical faces of peds; noneffervescent by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter 1:1 water; Matrix of horizon violently effervescent with addition of hydrogen peroxide. Carbonized root tracings are noneffervescent with addition of hydrogen peroxide.; clear smooth boundary; Lab sample # E4045.

Cg --- 244 to 275 centimeters; light brownish gray (2.5Y 6/2) moist, stratified, fine sandy loam; massive; very friable; 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.5, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4046.

Ck --- 275 to 310 centimeters; pale brown (10YR 6/3) moist, stratified, fine sandy loam; massive; very friable; 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 20 percent (many) light gray (10YR 7/2), moist, iron depletions; 1 percent (few) medium faint spherical noncemented masses of carbonate with clear boundaries throughout; noneffervescent by HCl, 1 normal; strongly alkaline, pH 8.6, pH meter 1:1 water; Field texture: fine sand; Lab sample # E4047.

PEDON DESCRIPTION

Pedon ID: S11TX2897015
Description Date: 5/17/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-5 terrace of ancient river system of the Keechi Creek watershed.
Pedon Notes: Text: Intermound channel between pimple mounds
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Freestone
Classification: Fine-loamy, siliceous, semiactive, thermic Glossaquic Paleudalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 86B - Texas Blackland Prairie, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B8 - Leona, Texas
Lat/Long: 31°13’34.17027” north, 95°55’30.07769” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1.5 percent
Elevation: 87.1 meters
Aspect: 113°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); BRCA6 - rescuegrass (*Bromus catharticus*); LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 19 to 69 centimeters
Diagnostic Features: Aquic conditions: 0 to 280 centimeters, Redox concentrations: 0 to 280 centimeters, Ochric epipedon: 0 to 19 centimeters, Abrupt textural change: 19 centimeters (Restrictive layer), Glossic horizon: 19 to 35 centimeters, Argillic horizon: 19 to 260 centimeters, Redox depletions with chroma 2 or less: 35 to 140 centimeters, Reduced matrix: 140 to 178 centimeters, Redox depletions with chroma 2 or less: 178 to 220 centimeters, Plinthite: 178 to 220 centimeters (Restrictive layer) and Reduced matrix: 220 to 260 centimeters
Restrictions: Abrupt textural change: 19 centimeters and Plinthite: 178 to 220 centimeters

Ap --- 0 to 19 centimeters; grayish brown (10YR 5/2) moist, fine sandy loam; light gray (10YR 7/2) dry; moderate coarse subangular blocky structure; friable, hard; common fine roots and common medium roots; 1 percent (few) black (10YR 2/1), moist, iron-manganese concretions, 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) brown (7.5YR 4/4), moist, masses of oxidized iron; 2 percent (common) distinct cylindrical very weakly cemented dark yellowish brown (10YR 4/4), moist, worm casts with sharp boundaries; noneffervescent by HCl, 1 normal; neutral, pH 6.6, pH meter 1:1 water; Field texture: very fine sandy loam; clear smooth boundary; Lab sample # E4048.

Bt/E --- 19 to 35 centimeters; 60 percent yellowish brown (10YR 5/4) moist and 40 percent light brownish gray (10YR 6/2) moist, clay loam; 60 percent light yellowish brown (10YR 6/4) dry and 40 percent light gray (10YR 7/2) dry; moderate medium subangular blocky structure; friable, hard; common fine roots; 2 percent (common) medium spherical moderately cemented 75 percent strong brown (7.5YR 5/6), moist and 25 percent black (10YR 2/1), moist, iron-manganese concretions sharp and 10 percent (common) masses of oxidized iron;

noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: loam; abrupt irregular boundary; Lab sample # E4049.

Bt1 --- 35 to 59 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky structure; firm; common fine roots; patchy distinct clay films on vertical faces of peds; 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions, 5 percent (common) pale brown (10YR 6/3), moist, iron depletions and 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4050.

Bt2 --- 59 to 91 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate coarse angular blocky structure; very firm; common fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 5 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 15 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron 1 to 2 percent krotovinas (volume percent); noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: clay and Inactive krotovinas (10YR 4/4) 10mm diameter.; gradual smooth boundary; Lab sample # E4051.

Bt3 --- 91 to 113 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky structure; very firm; common fine roots; discontinuous distinct clay films on vertical faces of peds; 1 percent (few) dark grayish brown (10YR 4/2), moist, iron depletions, 5 percent (common) red (2.5YR 5/6), moist, masses of oxidized iron and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) medium masses of barite; 1 percent flat subangular moderately cemented shale fragments; noneffervescent by HCl, 1 normal; slightly acid, pH 6.5, pH meter 1:1 water; Field texture: sandy clay loam and lenticular fragments of shale or organic material (10YR 3/2).; gradual smooth boundary; Lab sample # E4052.

Bt4 --- 113 to 140 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky structure; very firm; many fine roots; 5 percent (few) discontinuous distinct yellowish brown (10YR 5/4), moist, skeletans on vertical faces of peds and continuous distinct clay films on vertical faces of peds; 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron, 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 10 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron; 1 percent shale fragments; noneffervescent by HCl, 1 normal; neutral, pH 6.9, pH meter 1:1 water; Field texture: sandy clay loam and lenticular fragments of shale or organic material (10YR 3/2).; gradual smooth boundary; Lab sample # E4053.

Btg --- 140 to 178 centimeters; variegated light gray (10YR 7/2) moist, clay loam; moderate coarse angular blocky structure; very firm; many fine roots; 2 percent (very few) continuous distinct sand coats on vertical faces of peds and continuous distinct clay films on vertical faces of peds; 10 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron, 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 30 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4054.

Btv --- 178 to 220 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; weak coarse angular blocky structure; very firm; common fine roots; 2 percent (very few) continuous distinct sand coats on vertical faces of peds and continuous distinct clay films on vertical faces of peds;

1 percent (few) fine prominent dendritic red (10R 4/6), moist, masses of oxidized iron sharp infused into matrix adjacent to pores, 10 percent (common) medium yellowish red (5YR 5/6), moist, masses of oxidized iron, 30 percent (many) light brownish gray (2.5Y 6/2), moist, iron depletions and 1 percent (few) weak red (10R 4/4), moist, plinthite nodules; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4055.

BCtg --- 220 to 260 centimeters; light gray (2.5Y 7/2) moist, sandy clay loam; weak coarse subangular blocky structure; very firm; patchy distinct clay films on vertical faces of peds; 5 percent (common) coarse prominent moderately cemented dark reddish brown (2.5YR 3/4), moist, iron-manganese concretions, 5 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron, 10 percent (common) strong brown (7.5YR 4/6), moist, masses of oxidized iron and 30 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.3, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4056.

CB --- 260 to 280 centimeters; pale brown (10YR 6/3) moist, fine sandy loam; weak coarse subangular blocky structure; firm; 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; Field texture: sandy clay loam; Lab sample # E4057.

N/A 280 centimeters; light gray (10YR 7/2) moist, stratified, clay; massive; very firm; extremely high vertical penetration resistance; noneffervescent by HCl, 1 normal; Not sampled. Impenetrable strata encountered.

PEDON DESCRIPTION

Pedon ID: S11TX2897016
Description Date: 5/17/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-5 terrace of ancient river system of the Keechi Creek watershed.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Freestone
Classification: Fine-loamy, siliceous, semiactive, thermic Glossaquic Paleudalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 86B - Texas Blackland Prairie, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B8 - Leona, Texas
Lat/Long: 31°13’33.95277” north, 95°55’30.26027” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 87.4 meters
Aspect: 113°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); BRCA6 - rescuegrass (*Bromus catharticus*); LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 68 to 118 centimeters
Diagnostic Features: Aquic conditions: 0 to 432 centimeters, Redox concentrations: 0 to 68 centimeters, Ochric epipedon: 0 to 68 centimeters, Abrupt textural change: 68 centimeters (Restrictive layer), Argillic horizon: 68 to 285 centimeters, Glossic horizon: 68 to 101 centimeters, Redox depletions with chroma 2 or less: 101 to 149 centimeters, Redox concentrations: 101 to 285 centimeters, Plinthite: 208 to 263 centimeters (Restrictive layer), Redox depletions with chroma 2 or less: 320 to 363 centimeters, Redox concentrations: 320 to 363 centimeters and Redox depletions with chroma 2 or less: 399 to 432 centimeters
Restrictions: Abrupt textural change: 68 centimeters and Plinthite: 208 to 243 centimeters

Ap --- 0 to 15 centimeters; brown (10YR 4/3) moist, very fine sandy loam; very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; common fine roots and common medium roots; 10 percent (common) fine distinct yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4078.

E1 --- 15 to 38 centimeters; light yellowish brown (10YR 6/4) moist, very fine sandy loam; very pale brown (10YR 7/4) dry; weak medium subangular blocky structure; friable; common fine roots and common medium roots; 5 percent (common) fine faint brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4079.

E2 --- 38 to 68 centimeters; light yellowish brown (10YR 6/4) moist, fine sandy loam; weak medium subangular blocky structure; friable; common fine roots and common medium roots; 2 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by

HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; clear smooth boundary; Lab sample # E4080.

Bt/E --- 68 to 101 centimeters; 60 percent strong brown (7.5YR 5/6) moist loam and 40 percent pale brown (10YR 6/3) moist fine sandy loam; moderate medium subangular blocky structure; firm; common fine roots, common medium roots and common coarse roots; 5 percent (common) medium light brownish gray (10YR 6/2), moist, iron depletions and 30 percent (many) brown (10YR 5/3), moist, iron depletions; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; Field texture: sandy clay loam; abrupt irregular boundary; Lab sample # E4081.

Bt1 --- 101 to 118 centimeters; strong brown (7.5YR 5/6) moist, clay; moderate medium angular blocky structure; very firm; common fine roots; distinct pressure faces on top faces of peds and continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) red (2.5YR 5/6), moist, masses of oxidized iron and 40 percent (many) grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; extremely acid, pH 4.3, pH meter 1:1 water; clear smooth boundary; Lab sample # E4082.

Bt2 --- 118 to 149 centimeters; brownish yellow (10YR 6/6) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) medium distinct light brownish gray (10YR 6/2), moist, iron depletions and 5 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4083.

Bt3 --- 149 to 169 centimeters; brownish yellow (10YR 6/6) moist, clay loam; moderate medium angular blocky structure; firm; moderately few fine roots; patchy distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 3 percent (common) red (2.5YR 4/8), moist, masses of oxidized iron and 15 percent (common) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4084.

Bt4 --- 169 to 189 centimeters; variegated yellowish brown (10YR 5/6) moist, clay loam; moderate medium angular blocky structure; firm; moderately few fine roots; patchy distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 20 percent (many) red (2.5YR 5/6), moist, masses of oxidized iron and 30 percent (many) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4085.

Bt5 --- 189 to 208 centimeters; variegated brown (7.5YR 5/4) moist, sandy clay loam; moderate medium angular blocky structure; firm; moderately few fine roots; continuous distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 2 percent (common) red (2.5YR 5/8), moist, masses of oxidized iron, 30 percent (many) pale brown (10YR 6/3), moist, iron depletions and 30 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4086.

Btv1 --- 208 to 243 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; moderate medium angular blocky structure; very firm; brittle; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 20 percent (many) red (10R 4/6), moist, plinthite nodules and 25 percent (many) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4087.

Btv2 --- 243 to 263 centimeters; red (2.5YR 5/6) moist, fine sandy loam; moderate medium angular blocky structure; very firm; brittle; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 10 percent (common) pale brown (10YR 6/3), moist, iron depletions, 20 percent (many) red (10R 4/6), moist, plinthite nodules and 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4088.

B't --- 263 to 285 centimeters; yellowish brown (10YR 5/6) moist, fine sandy loam; weak medium subangular blocky structure; firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 2 percent (common) red (2.5YR 5/6), moist, masses of oxidized iron and 40 percent (many) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly acid, pH 6.5, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4089.

BC --- 285 to 320 centimeters; strong brown (7.5YR 5/8) moist and; brownish yellow (10YR 6/8) moist, stratified, fine sandy loam; weak coarse subangular blocky structure; friable; very few fine roots; 3 percent (common) very pale brown (10YR 7/3), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4090.

CB --- 320 to 363 centimeters; strong brown (7.5YR 5/6) moist, stratified, fine sandy loam; weak coarse subangular blocky structure; friable; 1 percent (few) reddish yellow (5YR 6/6), moist, masses of oxidized iron and 3 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 6.7, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4091.

C1 --- 363 to 399 centimeters; strong brown (7.5YR 5/6) moist, stratified, loamy fine sand; massive; friable; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4092.

C2 --- 399 to 432 centimeters; brownish yellow (10YR 6/6) moist, stratified, fine sand; massive; very friable; 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 6.6, pH meter 1:1 water; Lab sample # E4093.

N/A 472 centimeters; light gray (10YR 7/2) moist, stratified, clay; massive; very firm; noneffervescent by HCl, 1 normal; Not sampled. Similar to impenetrable strata encountered in S11TX2897015 at 280cm depth.

PEDON DESCRIPTION

Pedon ID: S11TX2897017
Description Date: 5/17/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-5 terrace of ancient river system of the Keechi Creek watershed.
Pedon Notes: Text: Summit of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Gallime
Classification: Fine-loamy, siliceous, semiactive, thermic Glossic Paleudalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 86B - Texas Blackland Prairie, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B8 - Leona, Texas
Lat/Long: 31°13’33.79849” north, 95°55’30.39599” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 87.8 meters
Aspect: 113°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); BRCA6 - rescuegrass (*Bromus catharticus*); LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 77 to 127 centimeters
Diagnostic Features: Ochric epipedon: 0 to 77 centimeters, Abrupt textural change: 77 centimeters (Restrictive layer), Redox concentrations: 77 to 313 centimeters, Glossic horizon: 77 to 143 centimeters, Argillic horizon: 77 to 353 centimeters, Redox depletions with chroma 2 or less: 111 to 432 centimeters, Plinthite: 238 to 284 centimeters (Restrictive layer), Redox concentrations: 432 to 500 centimeters and Reduced matrix: 432 to 500 centimeters
Restrictions: Abrupt textural change: 77 centimeters and Plinthite: 238 to 284 centimeters

Ap --- 0 to 18 centimeters; brown (10YR 4/3) moist, very fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; common medium roots and common fine roots; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4094.

E1 --- 18 to 45 centimeters; yellowish brown (10YR 5/4) moist, very fine sandy loam; weak medium subangular blocky and weak medium platy structure; friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4095.

E2 --- 45 to 77 centimeters; reddish yellow (7.5YR 6/6) moist, very fine sandy loam; very pale brown (10YR 7/4) dry; weak medium subangular blocky structure; friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E4096.

E/Bt --- 77 to 111 centimeters; 75 percent yellowish brown (10YR 5/6) moist and 25 percent light yellowish brown (2.5Y 6/4) moist, fine sandy loam; moderate medium subangular blocky structure; firm; common fine roots and common medium roots; 3 percent (common) black (10YR 2/1), moist, iron-manganese concretions and 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; gradual irregular boundary; Lab sample # E4097.

Bt/E --- 111 to 143 centimeters; yellowish brown (10YR 5/4) moist and; dark yellowish brown (10YR 4/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; common fine roots and common medium roots; continuous distinct yellowish brown (10YR 5/4), moist, skeletans on all faces of peds; 5 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 25 percent (many) dark yellowish brown (10YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; clear irregular boundary; Lab sample # E4098.

Bt1 --- 143 to 160 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 2 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron and 40 percent (many) grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E4099.

Bt2 --- 160 to 183 centimeters; yellowish brown (10YR 5/4) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 5 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 40 percent (many) dark yellowish brown (10YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4100.

Bt3 --- 183 to 217 centimeters; light olive brown (2.5Y 5/3) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; continuous distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 30 percent (many) red (2.5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4101.

Bt4 --- 217 to 238 centimeters; variegated reddish yellow (7.5YR 6/6) moist, sandy clay loam; moderate medium angular blocky structure; very firm; very few fine roots; continuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 30 percent (many) coarse light brownish gray (10YR 6/2), moist, iron depletions and 30 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4102.

Btv1 --- 238 to 258 centimeters; reddish yellow (7.5YR 6/6) moist, sandy clay loam; moderate medium angular blocky structure; firm; continuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 5 percent (common) red (10R 4/6), moist, plinthite nodules, 25 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron and 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; 1 percent (few) barite crystals; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4103.

Btv2 --- 258 to 284 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; weak medium subangular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 1 percent (few) red (10R 4/6), moist, plinthite nodules and 40 percent (many) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4104.

BCt1 --- 284 to 313 centimeters; light yellowish brown (10YR 6/4) moist, sandy clay loam; weak coarse subangular blocky structure; friable; patchy distinct clay films on vertical faces of peds; 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron, 20 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 20 percent (many) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; Field texture: fine sandy loam; gradual smooth boundary; Lab sample # E4105.

BCt2 --- 313 to 353 centimeters; yellowish brown (10YR 5/6) moist, fine sandy loam; weak coarse subangular blocky structure; friable; 1 percent (very few) patchy distinct yellowish red (5YR 4/6), moist, clay films on vertical faces of peds; 10 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E4106.

C1 --- 353 to 393 centimeters; strong brown (7.5YR 5/6) moist, stratified, fine sandy loam; massive; friable; 10 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E4107.

C2 --- 393 to 432 centimeters; light yellowish brown (10YR 6/4) moist and; strong brown (7.5YR 5/6) moist, stratified, fine sandy loam; massive; friable; 1 percent (few) light gray (10YR 7/1), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; Field texture: loamy fine sand and Alternating strata of 6-10cm vertical distance.; gradual smooth boundary; Lab sample # E4108.

Cg --- 432 to 500 centimeters; light gray (10YR 7/2) moist, stratified, fine sandy loam; massive; friable; 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 10 percent (common) yellowish brown (10YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; Field texture: loamy sand and Alternating strata of 6-10cm vertical distance.; Lab sample # E4109.

PEDON DESCRIPTION

Pedon ID: S11TX2897018
Description Date: 5/17/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-5 terrace of ancient river system of the Keechi Creek watershed.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Gallime
Classification: Fine-loamy, siliceous, semiactive, thermic Glossic Paleudalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 86B - Texas Blackland Prairie, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B8 - Leona, Texas
Lat/Long: 31°13’33.57832” north, 95°55’30.54156” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 87.5 meters
Aspect: 113°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); BRCA6 - rescuegrass (*Bromus catharticus*); LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 78 to 128 centimeters
Diagnostic Features: Redox concentrations: 0 to 17 centimeters, Ochric epipedon: 0 to 59 centimeters, Redox concentrations: 38 to 29 centimeters, Glossic horizon: 59 to 103 centimeters, Redox concentrations: 78 to 399 centimeters, Argillic horizon: 78 to 284 centimeters, Reduced matrix: 103 to 133 centimeters, Redox depletions with chroma 2 or less: 133 to 149 centimeters, Redox depletions with chroma 2 or less: 208 to 244 centimeters and Reduced matrix: 244 to 284 centimeters

Ap --- 0 to 17 centimeters; brown (10YR 4/3) moist, very fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky parting to moderate medium granular structure; friable; common fine roots and common medium roots; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; neutral, pH 6.6, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4110.

E1 --- 17 to 38 centimeters; yellowish brown (10YR 5/4) moist, very fine sandy loam; light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; very friable; moderately few medium roots and common fine roots; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4111.

E2 --- 38 to 59 centimeters; brownish yellow (10YR 6/6) moist, very fine sandy loam; very pale brown (10YR 7/4) dry; weak medium subangular blocky structure; very friable; common fine roots and moderately few medium roots; 2 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.3, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4112.

E/Bt --- 59 to 78 centimeters; 60 percent light yellowish brown (10YR 6/4) moist and 40 percent brownish yellow (10YR 6/6) moist, very fine sandy loam; 60 percent very pale brown (10YR 7/4) dry and 40 percent yellowish brown (10YR 5/6) dry; moderate medium subangular blocky structure; friable; common fine roots; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: fine sandy loam; clear irregular boundary; Lab sample # E4113.

Bt/E --- 78 to 103 centimeters; 54 percent yellowish brown (10YR 5/6) moist and 35 percent very pale brown (10YR 7/3) moist, fine sandy loam; 54 percent brownish yellow (10YR 6/6) dry and 35 percent very pale brown (10YR 8/3) dry; weak medium subangular blocky structure; firm; common fine roots; common medium pores; 1 percent (few) medium black (10YR 2/1), moist, iron-manganese concretions, 5 percent (common) faint strong brown (7.5YR 5/6), moist, masses of oxidized iron and 5 percent (common) faint brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; Field texture: sandy clay loam; abrupt irregular boundary; Lab sample # E4114.

Btg --- 103 to 133 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; common fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron, 5 percent (common) medium spherical weakly cemented 70 percent red (10R 4/6), moist, 20 percent brown (10YR 5/3), moist and 10 percent very dark gray (10YR 3/1), moist, ironstone nodules throughout and 40 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E4115.

Bt1 --- 133 to 149 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct clay films on vertical faces of peds; 2 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron and 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E4116.

Bt2 --- 149 to 183 centimeters; light yellowish brown (10YR 6/4) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct clay films on vertical faces of peds; 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 45 percent (many) coarse red (2.5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4117.

Bt3 --- 183 to 208 centimeters; pale brown (10YR 6/3) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct clay films on vertical faces of peds; 10 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) medium white (N 8/), moist, barite crystals; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4118.

Bt4 --- 208 to 244 centimeters; pale brown (10YR 6/3) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct clay films on vertical faces of peds; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions, 40 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; 2 percent (common) medium white (N 8/), moist, barite crystals; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4119.

B'tg --- 244 to 284 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; weak coarse subangular blocky structure; firm; moderately few fine roots; patchy distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 1 percent (few) prominent yellowish brown (10YR 5/4), moist, ferriargillans on vertical faces of peds, 1 percent (few) fine prominent threadlike noncemented red (2.5YR 5/6), moist, masses of oxidized iron sharp infused into matrix adjacent to pores, 20 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron and 30 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; clear smooth boundary; Lab sample # E4120.

BC --- 284 to 317 centimeters; yellowish brown (10YR 5/8) moist, stratified, fine sandy loam; weak coarse subangular blocky structure; firm; 2 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron, 5 percent (common) strong brown (7.5YR 5/8), moist, masses of oxidized iron and 10 percent (common) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 6.6, pH meter 1:1 water; clear smooth boundary; Lab sample # E4121.

CB --- 317 to 360 centimeters; yellowish brown (10YR 5/6) moist, stratified, loamy fine sand; weak coarse subangular blocky structure; very friable; 1 percent (few) yellowish red (5YR 5/6), moist, masses of oxidized iron, 1 percent (few) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 2 percent (common) very dark gray (10YR 3/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: fine sandy loam; clear smooth boundary; Lab sample # E4122.

C1 --- 360 to 399 centimeters; brown (7.5YR 5/4) moist, stratified, fine sandy loam; massive; very friable; 1 percent (few) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 10 percent (common) light yellowish brown (10YR 6/4), moist, iron depletions; noneffervescent by HCl, 1 normal; slightly acid, pH 6.2, pH meter 1:1 water; Field texture: loamy fine sand and Horizontal layer (396-393cm) consisting of silty clay loam material (field texture.); clear smooth boundary; Lab sample # E4123.

C2 --- 399 to 475 centimeters; 60 percent reddish yellow (7.5YR 6/6) moist, 20 percent light gray (10YR 7/2) moist and 20 percent yellowish brown (10YR 5/4) moist, stratified, loamy fine sand; massive; very friable; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Field texture: fine sand; Lab sample # E4124.

PEDON DESCRIPTION

Pedon ID: S11TX2897019
Description Date: 5/17/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-5 terrace of ancient river system of the Keechi Creek watershed.
Pedon Notes: Text: Broad intermound channel between pimple mounds.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Gallime
Classification: Fine, mixed, semiactive, thermic Glossic Paleudalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 86B - Texas Blackland Prairie, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B8 - Leona, Texas
Lat/Long: 31°13’33.07652” north, 95°55’30.9307” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1.5 percent
Elevation: 87 meters
Aspect: 113°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); HOPU - little barley (*Hordeum pusillum*); BRCA6 - rescuegrass (*Bromus catharticus*); LOLIU - ryegrass (*Lolium*)
Parent Materials: alluvium
Particle Size Control Section: 46 to 96 centimeters
Diagnostic Features: Redox concentrations: 0 to 406 centimeters, Ochric epipedon: 0 to 20 centimeters, Glossic horizon: 20 to 46 centimeters, Argillic horizon: 46 to 270 centimeters, Aquic conditions: 113 to 460 centimeters, Redox depletions with chroma 2 or less: 113 to 206 centimeters, Reduced matrix: 206 to 270 centimeters, Redox depletions with chroma 2 or less: 406 to 460 centimeters and Redox concentrations: 443 to 460 centimeters

Ap --- 0 to 20 centimeters; brown (10YR 5/3) moist, loam; very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; firm, very hard; common medium roots and common fine roots; 10 percent (common) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay loam; clear smooth boundary; Lab sample # E4125.

E/Bt --- 20 to 46 centimeters; 80 percent pale brown (10YR 6/3) moist and 20 percent strong brown (7.5YR 5/6) moist, loam; 80 percent very pale brown (10YR 7/3) dry; moderate fine subangular blocky and moderate medium subangular blocky structure; friable; common fine roots and common medium roots; 2 percent (common) fine yellowish brown (10YR 5/8), moist, masses of oxidized iron on surfaces along root channels; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.5, pH meter 1:1 water; abrupt wavy boundary; Lab sample # E4126.

Bt1 --- 46 to 72 centimeters; brown (10YR 5/3) moist, clay loam; pale brown (10YR 6/3) dry; moderate medium angular blocky structure; very firm; common fine roots and common medium roots; 2 percent (very few) patchy distinct very pale brown (10YR 7/3), moist, skeletans on all faces of peds and patchy distinct clay films on vertical faces of peds; 10 percent (common) medium strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.5, pH meter 1:1 water; Field texture: silty clay loam; gradual smooth boundary; Lab sample # E4127.

Bt2 --- 72 to 113 centimeters; pale brown (10YR 6/3) moist, clay loam; very pale brown (10YR 7/3) dry; moderate medium angular blocky structure; very firm; common medium roots and common fine roots; patchy distinct clay films on vertical faces of peds; 25 percent (many) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: silty clay loam; gradual smooth boundary; Lab sample # E4128.

Bt3 --- 113 to 136 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky structure; very firm; common fine roots; discontinuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) fine light brownish gray (10YR 6/2), moist, iron depletions and 7 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: clay; clear smooth boundary; Lab sample # E4129.

Bt4 --- 136 to 170 centimeters; yellowish brown (10YR 5/4) moist, clay loam; moderate medium angular blocky structure; very firm; common fine roots; patchy distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese masses, 2 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron, 10 percent (common) medium light brownish gray (10YR 6/2), moist, iron depletions and 30 percent (many) faint yellowish brown (10YR 5/6), moist, masses of oxidized iron; 1 percent (few) medium distinct barite crystals; noneffervescent by HCl, 1 normal; neutral, pH 7.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4130.

Bt5 --- 170 to 206 centimeters; light yellowish brown (10YR 6/4) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 5 percent (common) medium light gray (10YR 7/1), moist, iron depletions and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4131.

Btg1 --- 206 to 251 centimeters; light gray (10YR 7/2) moist, sandy clay loam; weak coarse subangular blocky structure; firm; moderately few fine roots; discontinuous distinct pale brown (10YR 6/3), moist, clay films on vertical faces of peds; 15 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4132.

Btg2 --- 251 to 270 centimeters; light brownish gray (10YR 6/2) moist, fine sandy loam; weak coarse subangular blocky structure; firm; continuous distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 30 percent (many) yellowish brown (10YR 5/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4133.

BC --- 270 to 298 centimeters; strong brown (7.5YR 5/8) moist, stratified, loamy fine sand; weak coarse subangular blocky structure; friable; 10 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron and 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 7.3, pH meter 1:1 water; Field texture: fine sandy loam; abrupt smooth boundary; Lab sample # E4134.

CB --- 298 to 321 centimeters; yellowish brown (10YR 5/8) moist, stratified, loamy fine sand; weak coarse subangular blocky structure; very friable; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 20 percent (many) red (2.5YR 4/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.3, pH meter 1:1 water; abrupt smooth boundary; Lab sample # E4135.

C1 --- 321 to 352 centimeters; red (2.5YR 5/8) moist, stratified, fine sand; massive; very friable; 10 percent (common) red (2.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; clear smooth boundary; Lab sample # E4136.

C2 --- 352 to 406 centimeters; strong brown (7.5YR 5/6) moist, stratified, loamy fine sand; massive; very friable; 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.2, pH meter 1:1 water; Field texture: fine sand; abrupt smooth boundary; Lab sample # E4137.

C3 --- 406 to 443 centimeters; yellowish brown (10YR 5/6) moist, stratified, silty clay; massive; firm; 10 percent (common) light brownish gray (2.5Y 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; neutral, pH 7.3, pH meter 1:1 water; Field texture: silty clay loam; abrupt smooth boundary; Lab sample # E4138.

C4 --- 443 to 460 centimeters; brownish yellow (10YR 6/6) moist, stratified, fine sandy loam; massive; very friable; 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions and 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 7.3, pH meter 1:1 water; Field texture: loamy fine sand; Lab sample # E4139.

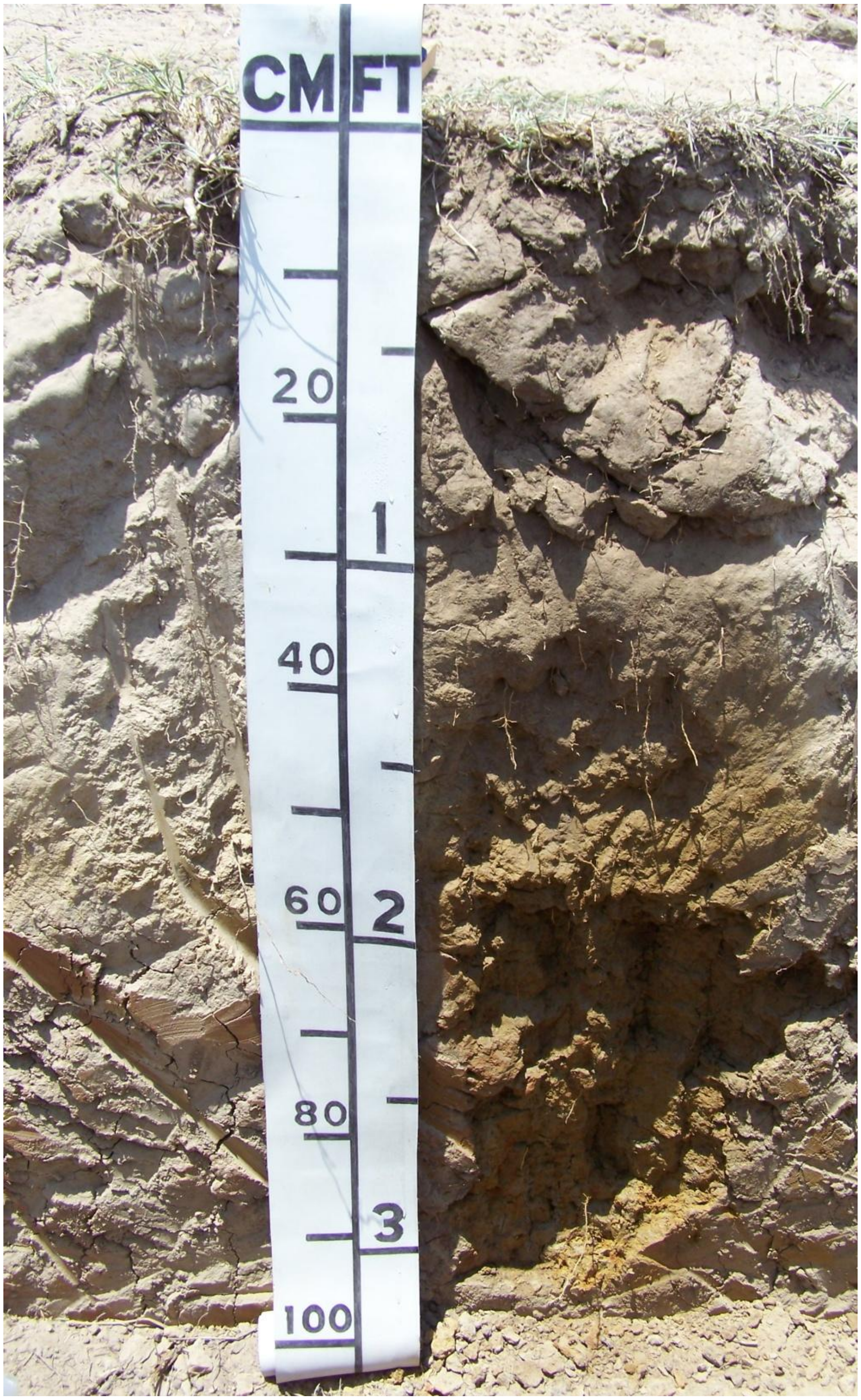

Fig. A-4. Photograph of pedon S11TX2897021 (courtesy of Julia McCormick).

PEDON DESCRIPTION

Pedon ID: S11TX2897021
Description Date: 5/18/2011
Describer: C.T. Hallmark, D.N. Brezina, J.A. McCormick, A. Peer, R.M. Reid, R. Molina, J. Gordon, C.N. Langston, and C.M. Robinson
Site Notes: Text: T-2 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine, smectitic, thermic Chromic Vertic Hapludalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°14’18.06545” north, 95°46’43.16404” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 57.1 meters
Aspect: 158°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); BRAR5 - field brome (*Bromus arvensis*); LOLIU - ryegrass (*Lolium*); 2GA - annual grasses; CAREX - sedge (*Carex*)
Parent Materials: alluvium
Particle Size Control Section: 50 to 100 centimeters
Diagnostic Features: Ochric epipedon: 0 to 50 centimeters, Aquic conditions: 50 to 317 centimeters, Redox concentrations: 50 to 227 centimeters, Argillic horizon: 50 to 191 centimeters, Abrupt textural change: 50 centimeters (Restrictive layer), Slickensides: 61 to 103 centimeters, Redox depletions with chroma 2 or less: 103 to 191 centimeters, Redox depletions with chroma 2 or less: 227 to 256 centimeters, Redox concentrations: 256 to 317 centimeters and Reduced matrix: 256 to 317 centimeters
Restrictions: Abrupt textural change: 50 centimeters

Ap --- 0 to 12 centimeters; brown (10YR 4/3) moist, fine sandy loam; pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; many fine roots and many medium roots; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4140.

E1 --- 12 to 32 centimeters; grayish brown (10YR 5/2) moist, fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky and weak fine subangular blocky structure; very friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E4141.

E2 --- 32 to 50 centimeters; yellowish brown (10YR 5/4) moist, fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4142.

Bt --- 50 to 61 centimeters; yellowish brown (10YR 5/6) moist, fine sandy loam; moderate medium subangular blocky structure; firm; common fine roots; discontinuous distinct clay films on surfaces along pores; 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; Field texture: sandy clay loam; abrupt smooth boundary; Lab sample # E4143.

Btss1 --- 61 to 81 centimeters; brown (10YR 5/3) moist, clay; moderate medium angular blocky and moderate medium wedge structure; very firm; common fine roots and common medium roots; continuous distinct slickensides (pedogenic) and continuous distinct clay films on vertical faces of peds; 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 25 percent (many) coarse yellowish red (5YR 4/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4144.

Btss2 --- 81 to 103 centimeters; yellowish brown (10YR 5/4) moist, clay; moderate medium angular blocky and moderate medium wedge structure; very firm; common fine roots and common medium roots; discontinuous distinct slickensides (pedogenic) and discontinuous distinct clay films on vertical faces of peds; 4 percent (common) pale brown (10YR 6/3), moist, iron depletions and 25 percent (many) coarse yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4145.

B't1 --- 103 to 135 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; moderate medium angular blocky structure; very firm; common fine roots; discontinuous distinct clay films on vertical faces of peds; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses on surfaces along root channels, 5 percent (common) medium yellowish red (5YR 4/6), moist, masses of oxidized iron and 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions infused into matrix along faces of peds; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4146.

B't2 --- 135 to 160 centimeters; yellowish brown (10YR 5/6) moist, sandy clay loam; moderate medium angular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 10 percent (common) medium yellowish red (5YR 4/6), moist, masses of oxidized iron and 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions throughout; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4147.

B't3 --- 160 to 191 centimeters; brownish yellow (10YR 6/6) moist, fine sandy loam; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 2 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron, 15 percent (common) light gray (10YR 7/1), moist, iron depletions throughout and 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions throughout; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; clear irregular boundary; Lab sample # E4148.

C1 --- 191 to 227 centimeters; very pale brown (10YR 7/3) moist, stratified, fine sand; single grain; loose; 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; Some intermingling from horizon above in top of horizon.; abrupt wavy boundary; Lab sample # E4149.

C2 --- 227 to 256 centimeters; strong brown (7.5YR 5/6) moist, stratified, loamy fine sand; massive; very friable; 5 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; Strong horizontal bedding planes.; gradual smooth boundary; Lab sample # E4150.

Cg1 --- 256 to 290 centimeters; light greenish gray (10BG 7/1) moist, stratified, sandy clay loam; massive; firm; 45 percent (many) reddish yellow (7.5YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.7, pH meter 1:1 water; clear smooth boundary; Lab sample # E4151.

Cg2 --- 290 to 317 centimeters; variegated light gray (2.5Y 7/2) moist, stratified, fine sandy loam; massive; firm; 50 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; Field texture: sandy clay loam; Lab sample # E4152.

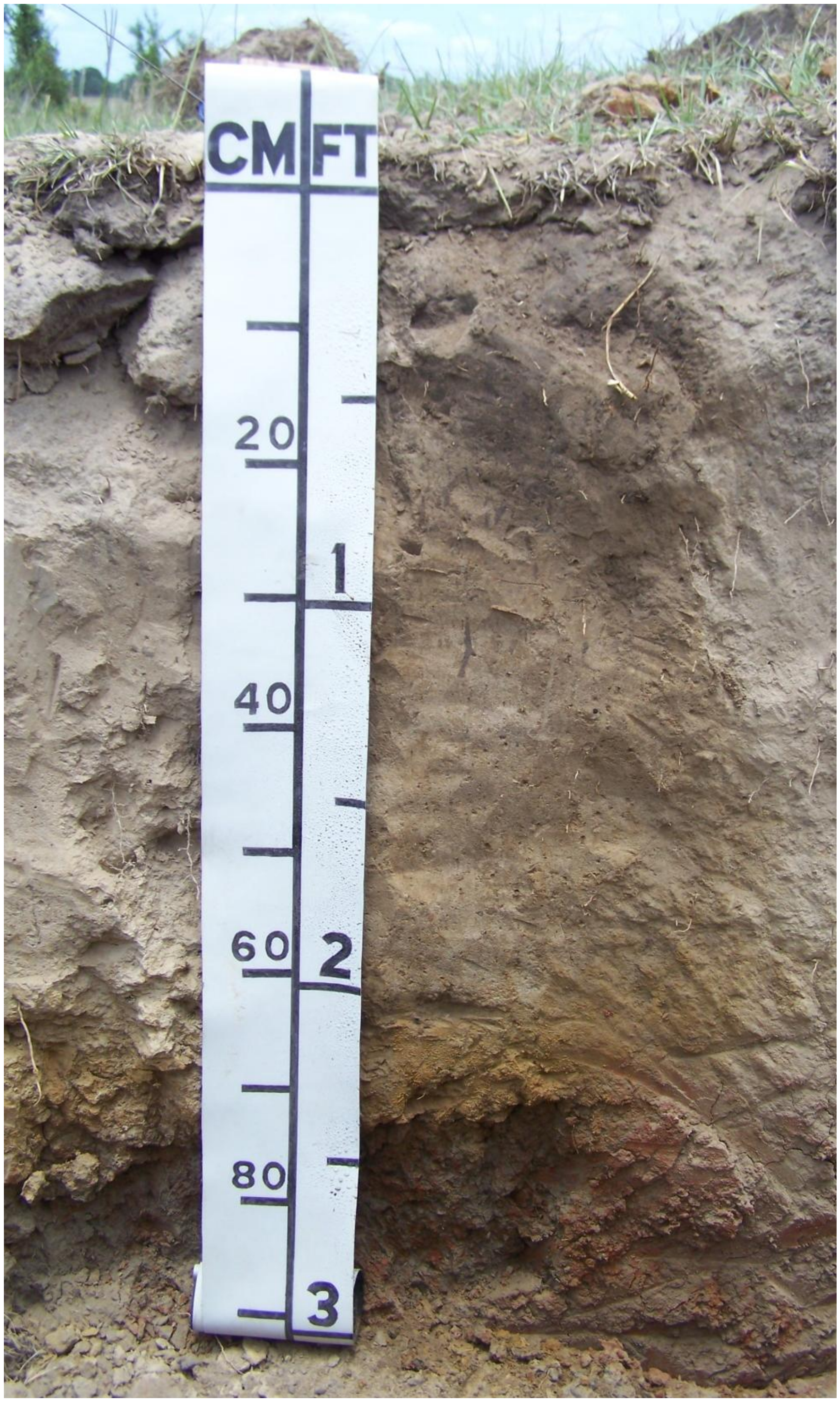

Fig. A-5. Photograph of pedon S11TX2897023 (courtesy of Julia McCormick).

PEDON DESCRIPTION

Pedon ID: S11TX2897023
Description Date: 6/15/2011
Describer: C.T. Hallmark, D.N. Brezina, J.A. McCormick, A. Peer, R.M. Reid, R. Molina, J. Gordon, C.N. Langston, and C.M. Robinson
Site Notes: Text: T-2 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Rader taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Chromic Vertic Hapludalfs
SSURGO MU: Rd - Rader-Derly complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
State or Territory: TX - Texas
7.5' Quad: 31095-B7 - Middleton, Texas
Lat/Long: 31°14’18.022” north, 95°46’43.59481” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 57.2 meters
Aspect: 158°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: CYDA - Bermudagrass (*Cynodon dactylon*); BRAR5 - field brome (*Bromus arvensis*); LOLIU - ryegrass (*Lolium*); 2GA - annual grasses; CAREX - sedge (*Carex*); DIOLS - Scribner panicum (*Dichanthelium oligosanthes var. scribnerianum*); SMILA2 - greenbriar (*Smilax*); 2TREE - other trees
Parent Materials: alluvium
Particle Size Control Section: 62 to 112 centimeters
Diagnostic Features: Aquic conditions: 0 to 322 centimeters, Redox concentrations: 0 to 190 centimeters, Ochric epipedon: 0 to 62 centimeters, Argillic horizon: 62 to 215 centimeters, Abrupt textural change: 62 centimeters (Restrictive layer), Slickensides: 75 to 96 centimeters, Plinthite: 96 to 150 centimeters (Restrictive layer), Redox depletions with chroma 2 or less: 150 to 215 centimeters, Redox concentrations: 215 to 289 centimeters, Reduced matrix: 215 to 247 centimeters, Endosaturation: 240 to 240 centimeters and Redox depletions with chroma 2 or less: 247 to 322 centimeters
Restrictions: Abrupt textural change: 62 centimeters and Plinthite: 96 to 150 centimeters

Ap --- 0 to 15 centimeters; dark brown (10YR 3/3) moist, fine sandy loam; brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; common medium roots and common fine roots; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; clear smooth boundary; Lab sample # E4153.

A --- 15 to 32 centimeters; brown (10YR 4/3) moist, fine sandy loam; pale brown (10YR 6/3) dry; weak fine subangular blocky and weak medium subangular blocky structure; friable; common fine roots and common medium roots; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 1 percent (few) dark yellowish brown (10YR 4/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.5, pH meter 1:1 water; clear smooth boundary; Lab sample # E4154.

E1 --- 32 to 49 centimeters; brown (10YR 5/3) moist, fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky structure; very friable; common fine roots and common medium roots; 1 percent (few) coarse moderately cemented black (10YR 2/1), moist, iron-manganese concretions and 10 percent (common) dark yellowish brown (10YR 4/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: loamy fine sand; gradual smooth boundary; Lab sample # E4155.

E2 --- 49 to 62 centimeters; yellowish brown (10YR 5/4) moist, fine sandy loam; weak medium subangular blocky structure; very friable; common medium roots and common fine roots; 10 percent (common) dark yellowish brown (10YR 4/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4156.

Bt --- 62 to 75 centimeters; yellowish brown (10YR 5/4) moist, fine sandy loam; moderate medium subangular blocky structure; firm; common medium roots and common fine roots; patchy distinct slickensides (pedogenic) and patchy distinct clay films on vertical faces of peds; 3 percent (common) pale brown (10YR 6/3), moist, iron depletions, 3 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron, 3 percent (common) black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) faint yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.2, pH meter 1:1 water; Field texture: sandy clay loam; clear smooth boundary; Lab sample # E4157.

Btss --- 75 to 96 centimeters; brown (10YR 5/3) moist, clay; strong medium angular blocky structure; firm; common fine roots and common medium roots; continuous distinct clay films on vertical faces of peds; 2 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 30 percent (many) coarse red (2.5YR 4/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4158.

Btv1 --- 96 to 126 centimeters; brown (10YR 5/3) moist, sandy clay; moderate medium angular blocky structure; very firm; common fine roots and common medium roots; continuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 30 percent (many) coarse red (2.5YR 4/8), moist, masses of oxidized iron and 1 percent (few) red (10R 4/6), moist, plinthite nodules; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.5, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4159.

Btv2 --- 126 to 150 centimeters; variegated red (2.5YR 4/6) moist, sandy clay loam; moderate medium angular blocky structure; firm; moderately few fine roots; discontinuous distinct brown (10YR 5/3), moist, clay films on vertical faces of peds; 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron, 40 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 1 percent (few) red (10R 4/6), moist, plinthite nodules; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E4160.

B't --- 150 to 190 centimeters; yellowish brown (10YR 5/6) moist, fine sandy loam; weak coarse subangular blocky structure; firm; patchy distinct brown (7.5YR 4/4), moist, clay films on vertical faces of peds; 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 20 percent (many) fine yellowish red (5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4161.

BCt --- 190 to 215 centimeters; yellowish brown (10YR 5/6) moist, fine sandy loam; weak coarse subangular blocky structure; very friable; patchy distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions on vertical faces of peds; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: loamy fine sand; clear smooth boundary; Lab sample # E4162.

Cg --- 215 to 247 centimeters; light gray (2.5Y 7/1) moist, stratified, fine sand; single grain; loose; 5 percent (common) pale yellow (2.5Y 7/3), moist, masses of oxidized iron, 5 percent (common) black (10YR 2/1), moist, iron-manganese masses and 15 percent (common) olive yellow (2.5Y 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; clear smooth boundary; Lab sample # E4163.

C1 --- 247 to 289 centimeters; strong brown (7.5YR 5/6) moist, stratified, fine sand; single grain; loose; 1 percent (few) yellowish red (5YR 5/6), moist, masses of oxidized iron, 2 percent (common) black (10YR 2/1), moist, iron-manganese masses and 4 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4164.

C2 --- 289 to 322 centimeters; yellowish brown (10YR 5/6) moist, stratified, fine sandy loam; massive; firm; 30 percent (many) greenish gray (10BG 6/1), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.6, pH meter 1:1 water; Field texture: sandy clay loam and Iron depletions (10BG 6/1) clay loam strata.; Lab sample # E4165.

PEDON DESCRIPTION

Pedon ID: S11TX2897025
Description Date: 7/20/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-4 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel between pimple mounds.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Rodessa
Classification: Fine, mixed, active, thermic Glossaquic Paleudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D7 - Lake Leon, Texas
Lat/Long: 31°28’27.35048” north, 95°46’21.89945” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1.5 percent
Elevation: 52 meters
Aspect: 135°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: PANO2 - bahiagrass (*Paspalum notatum*); CRCA6 - woolly croton (*Croton capitatus*); SPIN4 - smutgrass (*Sporobolus indicus*)
Parent Materials: alluvium
Particle Size Control Section: 38 to 88 centimeters
Diagnostic Features: Redox concentrations: 0 to 231 centimeters, Ochric epipedon: 0 to 38 centimeters, Aquic conditions: 38 to 535 centimeters, Glossic horizon: 38 to 59 centimeters, Argillic horizon: 38 to 336 centimeters, Reduced matrix: 59 to 194 centimeters, Redox depletions with chroma 2 or less: 194 to 293 centimeters, Redox concentrations: 293 to 336 centimeters, Reduced matrix: 293 to 336 centimeters, Redox depletions with chroma 2 or less: 336 to 515 centimeters and Redox concentrations: 413 to 535 centimeters

Ap --- 0 to 9 centimeters; brown (10YR 5/3) moist, very fine sandy loam; brownish yellow (10YR 6/6) dry; weak medium granular and moderate medium subangular blocky structure; friable; common fine roots and common medium roots; 1 percent (few) yellowish brown (10YR 5/4), moist, masses of oxidized iron and 2 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; clear smooth boundary; Lab sample # E4166.

E --- 9 to 38 centimeters; 90 percent light brown (7.5YR 6/3) moist and 10 percent brown (7.5YR 5/4) moist, very fine sandy loam; 90 percent pink (7.5YR 7/3) dry; weak medium subangular blocky structure; friable; common fine roots and common medium roots; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; 10% argillic material (7.5YR 5/4); clear wavy boundary; Lab sample # E4167.

E/Bt --- 38 to 59 centimeters; 75 percent pale brown (10YR 6/3) moist and 25 percent yellowish brown (10YR 5/6) moist, very fine sandy loam; 75 percent light gray (10YR 7/2) dry; weak medium subangular blocky structure; friable; common fine roots; common fine vesicular moderate continuity pores; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; 25% argillic material (10YR 5/6); abrupt wavy boundary; Lab sample # E4168.

Btg1 --- 59 to 93 centimeters; light brownish gray (10YR 6/2) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct clay films on vertical faces of peds and 1 percent (very few) light gray (10YR 7/2), moist, skeletans on vertical faces of peds; 10 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4169.

Btg2 --- 93 to 147 centimeters; light brownish gray (10YR 6/2) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; discontinuous distinct grayish brown (10YR 5/2), moist, clay films on vertical faces of peds; 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron and 40 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4170.

Btg3 --- 147 to 194 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 10 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 30 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4171.

Bt1 --- 194 to 231 centimeters; light yellowish brown (10YR 6/4) moist, clay loam; moderate medium angular blocky structure; firm; very few fine roots and very few medium roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) strong brown (7.5YR 5/8), moist, masses of oxidized iron, 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron and 40 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4172.

Bt2 --- 231 to 293 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; weak medium subangular blocky structure; firm; very few fine roots; patchy distinct yellowish brown (10YR 5/4), moist, clay films on vertical faces of peds; 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4173.

B'tg --- 293 to 336 centimeters; light brownish gray (10YR 6/2) moist, clay; weak coarse subangular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 30 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4174.

BC --- 336 to 413 centimeters; strong brown (7.5YR 5/6) moist, stratified, silty clay loam; weak coarse subangular blocky structure; friable; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.5, pH meter 1:1 water; Field texture: silt loam and faint bedding planes present.; clear smooth boundary; Lab sample # E4175.

C1 --- 413 to 439 centimeters; light yellowish brown (10YR 6/4) moist, stratified, clay and silt loam; massive; very firm; 2 percent (common) noncemented black (10YR 2/1), moist, iron-manganese masses and 10 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; Silt Loam strata 1-2mm thick.; clear smooth boundary; Lab sample # E4176.

C2 --- 439 to 515 centimeters; light yellowish brown (10YR 6/4) moist, stratified, clay and silt loam; massive; very firm; 2 percent (common) noncemented black (10YR 2/1), moist, iron-manganese masses and 5 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; Silt Loam strata 1-2mm thick.; clear smooth boundary; Lab sample # E4177.

C3 --- 515 to 535 centimeters; yellowish brown (10YR 5/6) moist, stratified, very fine sandy loam; massive; friable; 5 percent (common) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Lab sample # E4178.

PEDON DESCRIPTION

Pedon ID: S11TX2897026
Description Date: 7/20/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-4 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Gallime
Classification: Coarse-loamy, siliceous, active, thermic Glossic Paleudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D7 - Lake Leon, Texas
Lat/Long: 31°28'27.47758" north, 95°46'21.70003" west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 52.3 meters
Aspect: 135°
Drainage: Moderately well drained
Erosion: Class 1
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: PANO2 - bahiagrass (*Paspalum notatum*); CRCA6 - woolly croton (*Croton capitatus*); RUBUS - blackberry (*Rubus*); SMILA2 - greenbriar (*Smilax*); QUERC - oak (*Quercus*); PASPA2 - paspalum (*Paspalum*)
Parent Materials: alluvium
Particle Size Control Section: 70 to 120 centimeters
Diagnostic Features: Ochric epipedon: 0 to 39 centimeters, Redox concentrations: 15 to 310 centimeters, Glossic horizon: 39 to 123 centimeters, Argillic horizon: 70 to 435 centimeters, Redox depletions with chroma 2 or less: 123 to 167 centimeters, Aquic conditions: 123 to 600 centimeters, Reduced matrix: 167 to 310 centimeters, Redox depletions with chroma 2 or less: 310 to 398 centimeters, Redox concentrations: 344 to 508 centimeters, Reduced matrix: 398 to 435 centimeters and Redox depletions with chroma 2 or less: 435 to 600 centimeters

Ap --- 0 to 15 centimeters; brown (10YR 5/3) moist, very fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; common very fine roots and common fine roots; noneffervescent by HCl, 1 normal; slightly acid, pH 6.1, pH meter 1:1 water; clear smooth boundary; Lab sample # E4179.

E --- 15 to 39 centimeters; pale brown (10YR 6/3) moist, very fine sandy loam; very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; common very fine roots and common fine roots; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions; noneffervescent by HCl, 1 normal; moderately acid, pH 5.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4180.

E/Bt --- 39 to 70 centimeters; 85 percent pale brown (10YR 6/3) moist and 15 percent yellowish brown (10YR 5/4) moist, very fine sandy loam; 85 percent very pale brown (10YR 7/3) dry and 15 percent light yellowish brown (10YR 6/4) dry; moderate medium subangular blocky structure; friable; common fine roots; 1 percent (very few) discontinuous distinct pale brown (10YR 6/3), moist and light gray (10YR 7/2), dry, skeletans on vertical faces of peds; 1 percent (few) fine black (10YR 2/1), moist, iron-manganese concretions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; 15% argillic material (10YR 6/4 dry; 10YR 5/4 moist); gradual wavy boundary; Lab sample # E4181.

Bt/E --- 70 to 123 centimeters; 70 percent brownish yellow (10YR 6/6) moist and 30 percent pale brown (10YR 6/3) moist, very fine sandy loam; strong medium subangular blocky structure; friable; very few fine roots; 5 percent (few) discontinuous distinct pale brown (10YR 6/3), moist and light gray (10YR 7/2), dry, skeletans on vertical faces of peds; 2 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: fine sandy loam and 30% E material (10YR 6/3 moist); abrupt wavy boundary; Lab sample # E4182.

Bt --- 123 to 167 centimeters; yellowish brown (10YR 5/6) moist, clay; moderate medium angular blocky structure; very firm; common fine roots; patchy distinct clay films on vertical faces of peds; 5 percent (common) medium reddish brown (5YR 4/4), moist, masses of oxidized iron and 30 percent (many) medium grayish brown (10YR 5/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4183.

Btg1 --- 167 to 197 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 5 percent (common) fine yellowish brown (10YR 5/6), moist, masses of oxidized iron and 40 percent (many) fine reddish brown (5YR 4/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4184.

Btg2 --- 197 to 244 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) medium ironstone nodules, 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 20 percent (many) red (2.5YR 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4185.

Btg3 --- 244 to 310 centimeters; light brownish gray (10YR 6/2) moist, sandy clay loam; moderate medium subangular blocky structure; firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 1 percent (few) yellowish red (5YR 5/6), moist, masses of oxidized iron and 10 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4186.

BCt --- 310 to 344 centimeters; yellowish brown (10YR 5/6) moist, stratified, clay; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 20 percent (many) gray (10YR 6/1), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: silty clay loam and Stratification within coarse structural units.; gradual smooth boundary; Lab sample # E4187.

CBt --- 344 to 398 centimeters; brownish yellow (10YR 6/6) moist, stratified, silty clay loam and silt loam; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 1 percent (few) very fine black (10YR 2/1), moist, iron-manganese concretions and 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions;

noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Alternating strata of silt loam and silty clay loam.; gradual smooth boundary; Lab sample # E4188.

CBtg --- 398 to 435 centimeters; 70 percent light gray (10YR 7/2) moist and 30 percent brownish yellow (10YR 6/6) moist, stratified, silty clay; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: silty clay loam and Strata of alternating color.; gradual smooth boundary; Lab sample # E4189.

C1 --- 435 to 508 centimeters; strong brown (7.5YR 5/6) moist, stratified, clay; massive; firm; 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 1 percent (few) black (10YR 2/1), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; Field texture: silty clay loam; gradual smooth boundary; Lab sample # E4190.

C2 --- 508 to 540 centimeters; strong brown (7.5YR 5/6) moist, stratified, clay loam; massive; firm; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: loam; gradual smooth boundary; Lab sample # E4191.

C3 --- 540 to 600 centimeters; strong brown (7.5YR 5/6) moist, stratified, very fine sandy loam; massive; friable; 2 percent (common) pink (7.5YR 7/3), moist, iron depletions and 8 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; Lab sample # E4192.

PEDON DESCRIPTION

Pedon ID: S11TX2897027
Description Date: 7/20/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-4 terrace of the Trinity River system.
Pedon Notes: Text: Summit of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Gallime
Classification: Coarse-loamy, siliceous, active, thermic Glossic Paleudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D7 - Lake Leon, Texas
Lat/Long: 31°28'27.57392" north, 95°46'21.53861" west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 52.6 meters
Aspect: 135°
Drainage: Well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: PANO2 - bahiagrass (*Paspalum notatum*); PASPA2 - paspalum (*Paspalum*); CRCA6 - woolly croton (*Croton capitatus*); RUBUS - blackberry (*Rubus*); SCSC - little bluestem (*Schizachyrium scoparium*); CAREX - sedge (*Carex*); SMILA2 - greenbriar (*Smilax*); AMBRO - ragweed (*Ambrosia*); LIST2 - sweetgum (*Liquidambar styraciflua*); PANIC - panicum (*Panicum*)
Parent Materials: alluvium
Particle Size Control Section: 98 to 148 centimeters
Diagnostic Features: Ochric epipedon: 0 to 76 centimeters, Redox concentrations: 22 to 76 centimeters, Glossic horizon: 76 to 160 centimeters, Redox concentrations: 98 to 402 centimeters, Argillic horizon: 98 to 402 centimeters, Aquic conditions: 160 to 570 centimeters, Redox depletions with chroma 2 or less: 160 to 208 centimeters, Reduced matrix: 208 to 402 centimeters, Redox depletions with chroma 2 or less: 402 to 570 centimeters and Redox concentrations: 542 to 570 centimeters

A --- 0 to 22 centimeters; brown (10YR 5/3) moist, very fine sandy loam; pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; common very fine roots and common fine roots; noneffervescent by HCl, 1 normal; moderately acid, pH 6, pH meter 1:1 water; clear smooth boundary; Lab sample # E4193.

E --- 22 to 76 centimeters; pale brown (10YR 6/3) moist, very fine sandy loam; very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; moderately few fine roots; 2 percent (common) fine black (10YR 2/1), moist, ironstone nodules; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: loamy very fine sand; gradual smooth boundary; Lab sample # E4194.

E/Bt --- 76 to 98 centimeters; 55 percent pale brown (10YR 6/3) moist and 45 percent yellowish brown (10YR 5/4) moist, very fine sandy loam; 55 percent very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; moderately few fine roots; 2 percent (common) fine black (10YR 2/1), moist, ironstone nodules; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.5, pH meter 1:1 water; 45% argillic material (10YR 5/4 moist); gradual wavy boundary; Lab sample # E4195.

Bt/E --- 98 to 160 centimeters; pale brown (10YR 6/3) moist and; yellowish brown (10YR 5/4) moist, very fine sandy loam; moderate medium subangular blocky structure; friable; brittle; moderately few fine roots; 5 percent (few) discontinuous distinct skeletans on vertical faces of peds; 2 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron and 5 percent (common) fine black (10YR 2/1), moist, iron-manganese concretions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; abrupt wavy boundary; Lab sample # E4196.

Bt --- 160 to 208 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 30 percent (many) light brownish gray (10YR 6/2), moist, iron depletions and 40 percent (many) coarse red (2.5YR 5/8), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4197.

Btg1 --- 208 to 232 centimeters; light brownish gray (10YR 6/2) moist, clay; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 10 percent (common) red (2.5YR 5/6), moist, masses of oxidized iron and 35 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; extremely acid, pH 4.4, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4198.

Btg2 --- 232 to 265 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 5 percent (common) red (2.5YR 4/6), moist, masses of oxidized iron and 20 percent (many) yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4199.

Btg3 --- 265 to 313 centimeters; light gray (10YR 7/2) moist, clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 15 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron; 2 percent (common) fine barite crystals; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.6, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4200.

Btg4 --- 313 to 380 centimeters; light gray (10YR 7/2) moist, clay loam; moderate medium subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 40 percent (many) medium yellowish brown (10YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4201.

BCtg --- 380 to 402 centimeters; light gray (10YR 7/2) moist, stratified, silty clay; weak medium angular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 20 percent (many) brown (7.5YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: clay loam; gradual smooth boundary; Lab sample # E4202.

CB --- 402 to 503 centimeters; yellowish brown (10YR 5/6) moist, stratified, silty clay; massive; firm; 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: silty clay loam; gradual smooth boundary; Lab sample # E4203.

C1 --- 503 to 542 centimeters; strong brown (7.5YR 5/6) moist, stratified, clay loam; massive; firm; 10 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4204.

C2 --- 542 to 570 centimeters; yellowish brown (10YR 5/8) moist, stratified, very fine sandy loam; massive; friable; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 1 percent (few) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Lab sample # E4205.

PEDON DESCRIPTION

Pedon ID: S11TX2897028
Description Date: 7/20/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-4 terrace of the Trinity River system.
Pedon Notes: Text: Edge of pimple mound.
Soil Name As Described/Sampled: Rader
Soil Name As Correlated: Gallime
Classification: Coarse-loamy, siliceous, active, thermic Glossic Paleudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D7 - Lake Leon, Texas
Lat/Long: 31°28’27.71725” north, 95°46’21.31153” west
Landscape: river valley
Landform: stream terrace
Microfeature: pimple mound
Slope: 1.5 percent
Elevation: 52.1 meters
Aspect: 135°
Drainage: Moderately well drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: PANO2 - bahiagrass (*Paspalum notatum*); PASPA2 - paspalum (*Paspalum*); CRCA6 - woolly croton (*Croton capitatus*); RUBUS - blackberry (*Rubus*); SCSC - little bluestem (*Schizachyrium scoparium*); CAREX - sedge (*Carex*); SMILA2 - greenbriar (*Smilax*); AMBRO - ragweed (*Ambrosia*); LIST2 - sweetgum (*Liquidambar styraciflua*); PANIC - panicum (*Panicum*); QUST - post oak (*Quercus stellata*)
Parent Materials: alluvium
Particle Size Control Section: 70 to 120 centimeters
Diagnostic Features: Ochric epipedon: 0 to 36 centimeters, Redox concentrations: 36 to 430 centimeters, Glossic horizon: 36 to 123 centimeters, Argillic horizon: 70 to 389 centimeters, Aquic conditions: 190 to 510 centimeters, Reduced matrix: 190 to 274 centimeters, Redox depletions with chroma 2 or less: 274 to 301 centimeters, Reduced matrix: 301 to 339 centimeters and Redox depletions with chroma 2 or less: 339 to 457 centimeters

Ap --- 0 to 15 centimeters; brown (10YR 4/3) moist, very fine sandy loam; pale brown (10YR 6/3) dry; moderate fine subangular blocky and moderate medium subangular blocky structure; very friable; common medium roots and common fine roots; hydrophobic layer; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter 1:1 water; 5% intermingled E material; clear smooth boundary; Lab sample # E4206.

E --- 15 to 36 centimeters; pale brown (10YR 6/3) moist, very fine sandy loam; very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; moderately few fine roots; noneffervescent by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter 1:1 water; Field texture: loamy very fine sand; clear smooth boundary; Lab sample # E4207.

E/Bt --- 36 to 70 centimeters; 60 percent pale brown (10YR 6/3) moist and 40 percent strong brown (7.5YR 5/6) moist, very fine sandy loam; 60 percent very pale brown (10YR 7/3) dry and 40 percent strong brown (7.5YR 5/6) dry; moderate medium subangular blocky structure; friable; moderately few fine roots; 10 percent (common) yellowish brown (10YR 5/4), moist, iron-manganese masses; noneffervescent by HCl, 1 normal; slightly acid, pH 6.5, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4208.

Bt/E --- 70 to 123 centimeters; 70 percent yellowish brown (10YR 5/6) moist and 30 percent pale brown (10YR 6/3) moist, very fine sandy loam; 30 percent light gray (10YR 7/2) dry; moderate medium subangular blocky structure; friable; moderately few fine roots; 20 percent (many) strong brown (7.5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; abrupt wavy boundary; Lab sample # E4209.

Bt --- 123 to 190 centimeters; variegated light brownish gray (10YR 6/2) moist, clay; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 30 percent (many) red (2.5YR 4/6), moist, masses of oxidized iron and 30 percent (many) yellowish brown (10YR 5/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.8, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4210.

Btg1 --- 190 to 250 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; very few fine roots; patchy distinct clay films on vertical faces of peds; 20 percent (many) fine strong brown (7.5YR 5/6), moist, masses of oxidized iron and 20 percent (many) medium red (2.5YR 4/6), moist, masses of oxidized iron; 1 percent (few) fine barite crystals; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4211.

Btg2 --- 250 to 274 centimeters; light gray (10YR 7/2) moist, clay loam; moderate medium angular blocky structure; very firm; patchy distinct clay films on vertical faces of peds; 20 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron and 30 percent (many) coarse brownish yellow (10YR 6/6), moist, masses of oxidized iron; 1 percent (few) fine barite crystals; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4212.

B't --- 274 to 301 centimeters; brownish yellow (10YR 6/6) moist, sandy clay loam; moderate medium subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 2 percent (common) light gray (10YR 7/2), moist, iron depletions, 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 20 percent (many) pale brown (10YR 6/3), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4213.

BCtg --- 301 to 339 centimeters; light brownish gray (10YR 6/2) moist, stratified, clay; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 40 percent (many) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4214.

BCt --- 339 to 389 centimeters; brownish yellow (10YR 6/6) moist, stratified, silty clay loam; weak coarse subangular blocky structure; firm; patchy distinct clay films on vertical faces of peds; 5 percent (common) medium light gray (10YR 7/2), moist, iron depletions, 10 percent (common) medium pale brown (10YR 6/3), moist, iron depletions along lamina or strata surfaces and 20 percent (many) medium reddish yellow (7.5YR 6/6), moist, masses of oxidized iron along lamina or strata surfaces; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: silt loam; gradual smooth boundary; Lab sample # E4215.

CB --- 389 to 430 centimeters; strong brown (7.5YR 5/6) moist, stratified, silty clay; massive; firm; 1 percent (few) black (10YR 2/1), moist, iron-manganese masses and 20 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.7, pH meter 1:1 water; Field texture: silt loam; clear smooth boundary; Lab sample # E4216.

C1 --- 430 to 457 centimeters; brownish yellow (10YR 6/6) moist, stratified, very fine sandy loam; massive; friable; 20 percent (many) pale brown (10YR 6/3), moist, iron depletions and 20 percent (many) medium light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4217.

C2 --- 457 to 510 centimeters; yellowish brown (10YR 5/6) moist, stratified, very fine sandy loam; massive; friable; 2 percent (common) pale brown (10YR 6/3), moist, iron depletions and 10 percent (common) light yellowish brown (10YR 6/4), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; strongly acid, pH 5.2, pH meter 1:1 water; Lab sample # E4218.

PEDON DESCRIPTION

Pedon ID: S11TX2897029
Description Date: 7/20/2011
Describer: C.T. Hallmark and Chance Robinson
Site Notes: Text: T-4 terrace of the Trinity River system.
Pedon Notes: Text: Intermound channel between pimple mounds.
Soil Name As Described/Sampled: Derly
Soil Name As Correlated: Derly taxadjunct
Classification: Fine-loamy, siliceous, active, thermic Albaquic Paleudalfs
SSURGO MU: Df - Derly-Rader Complex, gently undulating
MLRA: 87A - Texas Claypan Area, Southern Part
County or Parish: TX289 - Leon
7.5' Quad: 31095-D7 - Lake Leon, Texas
Lat/Long: 31°28’27.90042” north, 95°46’21.02897” west
Landscape: river valley
Landform: stream terrace
Microfeature: swale
Slope: 1.5 percent
Elevation: 51.7 meters
Aspect: 135°
Drainage: Somewhat poorly drained
Primary Earth Cover: Grass/herbaceous cover; **Secondary Earth Cover:** Tame pastureland
Existing Vegetation: PANO2 - bahiagrass (*Paspalum notatum*); CRCA6 - woolly croton (*Croton capitatus*); SPIN4 - smutgrass (*Sporobolus indicus*)
Parent Materials: alluvium
Particle Size Control Section: 36 to 86 centimeters
Diagnostic Features: Ochric epipedon: 0 to 36 centimeters, Aquic conditions: 36 to 390 centimeters, Redox depletions with chroma 2 or less: 36 to 68 centimeters, Redox concentrations: 36 to 263 centimeters, Argillic horizon: 36 to 263 centimeters, Abrupt textural change: 36 centimeters (Restrictive layer), Reduced matrix: 153 to 226 centimeters, Redox depletions with chroma 2 or less: 226 to 390 centimeters and Redox concentrations: 314 to 333 centimeters
Restrictions: Abrupt textural change: 36 centimeters

Ap --- 0 to 10 centimeters; brown (10YR 5/3) moist, very fine sandy loam; pale brown (10YR 6/3) dry; weak fine subangular blocky and weak medium subangular blocky structure; friable; common fine roots and common medium roots; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; 10% E material; clear smooth boundary; Lab sample # E4219.

E --- 10 to 36 centimeters; pale brown (10YR 6/3) moist, very fine sandy loam; light gray (10YR 7/2) dry; moderate medium subangular blocky structure; friable; common fine roots; noneffervescent by HCl, 1 normal; strongly acid, pH 5.4, pH meter 1:1 water; 10% argillic material (10YR 5/4 dry; 10YR 4/4 moist); abrupt wavy boundary; Lab sample # E4220.

Bt1 --- 36 to 68 centimeters; yellowish brown (10YR 5/6) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 5 percent (common) red (2.5YR 5/6), moist, masses of oxidized iron and 5 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 4.9, pH meter 1:1 water; Field texture: clay; gradual smooth boundary; Lab sample # E4221.

Bt2 --- 68 to 128 centimeters; yellowish brown (10YR 5/4) moist, sandy clay loam; moderate medium angular blocky structure; very firm; moderately few very fine roots and moderately few fine roots; 5 percent (few) light yellowish brown (10YR 6/4), moist, sand coats on vertical faces of peds and discontinuous distinct clay films on vertical faces of peds; 2 percent (common) black (10YR 2/1), moist, iron-manganese masses and 5 percent (common) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E4222.

Bt3 --- 128 to 153 centimeters; light yellowish brown (10YR 6/4) moist, sandy clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; 2 percent (very few) light yellowish brown (10YR 6/4), moist, sand coats on vertical faces of peds and discontinuous distinct 80 percent light yellowish brown (10YR 6/4), moist and 20 percent light brownish gray (10YR 6/2), moist, clay films on vertical faces of peds; 10 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron and 30 percent (many) red (10R 4/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; neutral, pH 6.6, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E4223.

Btg1 --- 153 to 189 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct pale brown (10YR 6/3), moist, clay films on vertical faces of peds; 5 percent (common) yellowish brown (10YR 5/6), moist, masses of oxidized iron and 5 percent (common) brownish yellow (10YR 6/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; slightly acid, pH 6.4, pH meter 1:1 water; Field texture: sandy clay; gradual smooth boundary; Lab sample # E4224.

Btg2 --- 189 to 226 centimeters; light brownish gray (10YR 6/2) moist, clay loam; moderate medium angular blocky structure; very firm; moderately few fine roots; patchy distinct clay films on vertical faces of peds; 30 percent (many) light yellowish brown (10YR 6/4), moist, masses of oxidized iron and 20 percent (many) yellowish red (5YR 5/6), moist, masses of oxidized iron; noneffervescent by HCl, 1 normal; moderately acid, pH 5.9, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4225.

B't --- 226 to 263 centimeters; brownish yellow (10YR 6/6) moist, stratified, clay; moderate medium subangular blocky structure; firm; discontinuous distinct clay films on vertical faces of peds; 5 percent (common) strong brown (7.5YR 5/6), moist, masses of oxidized iron along lamina or strata surfaces and 40 percent (many) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: sandy clay loam; gradual smooth boundary; Lab sample # E4226.

BC --- 263 to 314 centimeters; brown (7.5YR 5/4) moist and strong brown (7.5YR 5/6) moist, stratified, silty clay and clay; weak coarse subangular blocky structure; firm; 15 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.1, pH meter 1:1 water; Field texture: silt loam and Clay strata (7.5YR 5/4) 1cm thick.; clear smooth boundary; Lab sample # E4227.

CB --- 314 to 333 centimeters; brown (7.5YR 5/4) moist, stratified, clay; massive; firm; 1 percent (few) black (10YR 2/1), moist, iron-manganese concretions and 2 percent (common) light brownish gray (10YR 6/2), moist, iron depletions; noneffervescent by HCl, 1 normal; very strongly acid, pH 5, pH meter 1:1 water; Field texture: silty clay loam; clear smooth boundary; Lab sample # E4228.

C1 --- 333 to 362 centimeters; yellowish brown (10YR 5/6) moist, stratified, loam; massive; firm; 10 percent (common) light gray (10YR 7/1), moist, ferriargillans along lamina or strata surfaces; noneffervescent by HCl, 1 normal; strongly acid, pH 5.3, pH meter 1:1 water; gradual smooth boundary; Lab sample # E4229.

C2 --- 362 to 390 centimeters; yellowish brown (10YR 5/6) moist, stratified, very fine sandy loam; massive; firm; 2 percent (common) light gray (10YR 7/2), moist, iron depletions; noneffervescent by HCl, 1 normal; strongly acid, pH 5.5, pH meter 1:1 water; Lab sample # E4230.

APPENDIX B

SOIL CHARACTERIZATION AND MINERALOGICAL DATA

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Derly — PEDON NUMBER: S11TX2890002 — 1/23/2012
SOIL FAMILY: Aquertic Glossudalf; fine-loamy, siliceous, active, thermic
LOCATION: Middleton Quad, Leon County, Texas

LAB NO	DEPTH (cm)	HORIZON	SAND VC (2.0-1.0)	SAND C (1.0-0.5)	SAND M (0.5-0.25)	SAND F (0.25-0.10)	SAND VF (0.10-0.05)	SAND TOTAL (2.0-0.05)	SILT FINE (0.02-0.002)	SILT TOTAL (0.05-0.002)	CLAY FINE (<0.0002)	CLAY TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	ORGN C %
			PARTICLE SIZE DISTRIBUTION (mm) %												
7745	0-12	Ap	0.1	0.2	3.5	38.6	17.5	59.9	14.5	26.3	6.6	13.8	FSL		1.37
7746	12-31	A	0.2	0.2	3.5	39.4	17.5	60.8	14.5	25.9	6.9	13.3	FSL		0.58
7747	31-42	AB	0.3	0.4	3.5	37.1	16.8	58.1	13.7	24.7	10.5	17.2	FSL		0.40
7748	42-61	Bt/E	0.4	0.3	2.4	30.0	14.9	48.0	13.4	23.0	22.0	29.0	SCL		0.37
7749	61-83	Btss	0.1	0.1	1.9	25.7	13.7	41.5	13.7	22.9	26.2	35.6	CL		0.32
7750	83-102	Btssg1	0.1	0.1	1.9	28.0	14.0	44.1	13.7	23.5	23.1	32.4	CL		0.27
7751	102-133	Btssg2	0.1	0.1	2.1	30.4	13.2	45.9	12.4	21.9	22.2	32.2	SCL		0.19
7752	133-168	Bt	0.0	0.1	2.1	37.2	14.5	53.9	9.4	18.6	19.6	27.5	SCL		0.13
7753	168-188	Btg1	0.0	0.1	1.8	44.3	16.0	62.2	7.2	15.1	16.2	22.7	SCL		0.13
7754	188-210	Btg2	0.0	0.0	1.6	55.6	16.2	73.4	4.9	10.7	11.3	15.9	FSL		0.09
7755	210-230	Btg3	0.0	0.1	4.4	46.2	15.7	66.4	6.6	13.9	13.4	19.7	FSL		0.09
7756	230-251	BC	0.0	0.0	3.7	37.6	28.4	69.7	5.6	16.4	8.9	13.9	FSL		0.07
7757	251-289	CB	0.0	0.1	7.1	40.7	16.2	64.1	7.6	15.8	13.2	20.1	SCL		0.08
7758	289-314	Cg	0.0	0.0	5.7	53.7	18.4	77.8	4.2	10.3	7.7	11.9	FSL		0.09
7759	314-348	C	0.0	0.1	21.0	66.4	4.3	91.8	1.1	2.8	3.7	5.4	FS		0.07

LAB NO	pH (H2O) 1:1	NH4OAc EXTR BASES CA	MG	NA	K	TOTAL	KCl EXTR AL	NaOAc CEC	ECEC	BASE SAT	ESP	SAR	CAL-CITE	DOLO-MITE	CACO3 EQ	GYP SUM
		Meq/100g								%			%			
7745	5.6	4.6	1.8	0.1	0.3	6.8		10.7		64	1					
7746	6.2	4.6	1.3	0.1	0.1	6.1		8.2		74	1					
7747	5.9	4.5	1.7	0.1	0.1	6.4		9.2		70	1					
7748	5.1	6.7	2.9	0.2	0.2	10.0	1.1	14.8	11.1	68	1					
7749	5.0	8.5	3.5	0.2	0.3	12.5	2.1	18.7	14.6	67	1					
7750	5.1	8.2	3.4	0.3	0.3	12.2	1.1	16.9	13.3	72	2					
7751	5.2	8.5	3.3	0.3	0.3	12.4	0.6	17.1	13.0	73	2					
7752	5.4	8.8	3.3	0.4	0.3	12.8	0.3	15.4	13.1	83	3					
7753	5.7	8.0	2.9	0.4	0.2	11.5		13.2		87	3					
7754	6.0	4.6	2.1	0.3	0.2	7.2		9.2		78	3					
7755	5.9	5.9	3.2	0.3	0.2	9.6		11.4		84	3					
7756	5.9	4.5	2.2	0.3	0.2	7.2		8.1		89	4					
7757	5.9	5.8	2.9	0.4	0.2	9.3		11.6		80	3					
7758	5.7	3.5	1.9	0.2	0.1	5.7		6.7		85	3					
7759	6.0	1.3	0.9	0.2	0.1	2.5		3.2		78	6					

LAB NO	ELEC COND dS/m	H2O CONT %	SATURATED PASTE EXTRACT CA	MG	NA	K	HCO3	CL	S04	BULK DENSITY 0.33 BAR	BULK DENSITY OVEN DRY	COLE cm/cm	WATER CONTENT 0.33 BAR	WATER CONTENT 15 BAR
			Meq/l							g/cc			WT%	
7745										1.47	1.62	0.033	24.6	
7746										1.52	1.63	0.024	21.9	
7747										1.56	1.68	0.025	21.6	
7748										1.49	1.73	0.051	24.6	
7749										1.50	1.85	0.072	26.5	
7750										1.56	1.84	0.057	23.3	
7751										1.56	1.86	0.060	23.9	
7752										1.56	1.87	0.062	23.3	
7753										1.61	1.82	0.042	21.6	
7754										1.54	1.72	0.038	22.4	
7755										1.56	1.75	0.039	21.2	
7756														
7757														
7758														
7759														

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2890003 1/20/2012
SOIL FAMILY: Glossic Hapludalf; fine-loamy, siliceous, active, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)													
			SAND						SILT		CLAY					
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	ORGN C %
			%												
7732	0-16	Ap	0.2	0.8	5.1	45.8	21.9	73.8	8.8	21.5	2.1	4.7	FSL		0.66
7733	16-31	A	0.3	0.4	5.4	46.5	21.7	74.3	8.5	21.0	1.9	4.7	FSL		0.27
7734	31-59	E1	0.2	0.2	4.2	46.9	22.6	74.1	8.7	21.2	2.0	4.7	FSL		0.15
7735	59-79	E2	0.2	0.2	4.5	46.1	21.6	72.6	9.6	22.3	2.1	5.1	FSL		0.12
7736	79-92	Bt1	0.2	0.2	3.7	40.1	18.2	62.4	10.6	21.1	9.5	16.5	FSL		0.18
7737	92-114	Bt2	0.0	0.0	4.0	33.0	8.9	45.9	8.0	14.3	30.5	39.8	SC		0.30
7738	114-134	Bt3	0.0	0.1	4.9	38.7	8.7	52.4	7.0	13.0	26.4	34.6	SCL		0.22
7739	134-161	Bt4	0.3	0.2	6.0	45.0	9.1	60.6	6.1	11.1	20.9	28.3	SCL		0.17
7740	161-187	Bt5	0.2	0.2	6.1	51.7	9.7	67.9	4.7	9.0	16.5	23.1	SCL		0.16
7741	187-220	BCtg	0.0	0.1	8.0	64.9	10.1	83.1	2.3	5.0	8.8	11.9	LFS		0.10
7742	220-246	C1	0.0	0.1	7.6	66.9	13.7	88.3	1.9	4.8	4.8	6.9	LFS		0.08
7743	246-285	C2	0.0	0.1	5.8	54.2	19.3	79.4	2.9	8.0	8.7	12.6	FSL		0.11
7744	285-320	C3	0.0	0.0	5.2	61.6	14.4	81.2	2.1	6.1	9.0	12.7	FSL		0.10

LAB NO	pH (H2O) 1:1	NH4OAc EXTR BASES CA	MG	NA	K	TOTAL	KCl EXTR AL	NaOAc CEC	ECEC	BASE SAT	ESP	SAR	CAL-CITE	DOLO-MITE	CACO3 EQ	GYP SUM
		Meq/100g								%			%			
7732	5.4	1.2	0.4	0.0	0.3	1.9	0.1	4.0	2.0	48	0					
7733	5.7	1.1	0.2	0.0	0.1	1.4		2.6		54	0					
7734	5.7	0.9	0.1	0.0	0.0	1.0		2.0		50	0					
7735	5.8	0.9	0.2	0.0	0.1	1.2		2.0		60	0					
7736	6.1	2.4	2.0	0.1	0.2	4.7		6.1		77	2					
7737	5.0	4.7	7.7	0.2	0.3	12.9	1.8	17.2	14.7	75	1					
7738	4.8	2.7	5.7	0.2	0.3	8.9	3.8	15.4	12.7	58	1					
7739	4.7	1.7	5.5	0.2	0.3	7.7	4.3	13.0	12.0	59	2					
7740	4.7	1.3	3.7	0.2	0.2	5.4	3.6	11.0	9.0	49	2					
7741	4.8	1.1	2.0	0.2	0.1	3.4	1.5	6.0	4.9	57	3					
7742	5.0	1.2	1.1	0.2	0.1	2.6	0.4	3.7	3.0	70	5					
7743	4.7	2.1	1.9	0.5	0.1	4.6	0.7	6.4	5.3	72	5	4				
7744	4.7	2.3	2.2	0.5	0.1	5.1	0.6	6.7	5.7	76	5	4				

LAB NO	SATURATED PASTE EXTRACT ELEC COND dS/m	H2O CONT %	CA	MG	NA	K	HCO3	CL	S04	BULK DENSITY 0.33 BAR	OVEN DRY	COLE cm/cm	WATER CONTENT 0.33 BAR	15 BAR
			Meq/l							g/cc			WT%	
7732										1.54	1.56	0.004	19.7	
7733										1.51	1.53	0.004	21.4	
7734										1.50	1.55	0.011	20.1	
7735										1.47	1.49	0.005	17.4	
7736										1.59	1.69	0.021	18.1	
7737										1.45	1.69	0.052	26.4	
7738										1.57	1.72	0.031	21.1	
7739										1.65	1.77	0.024	18.1	
7740										1.59	1.74	0.031	20.1	
7741										1.56	1.69	0.027	19.7	
7742										1.51	1.57	0.013	18.9	
7743	1.1	31	2.1	2.1	5.3	0.2								
7744	1.1	32	2.2	2.1	5.4	0.2								

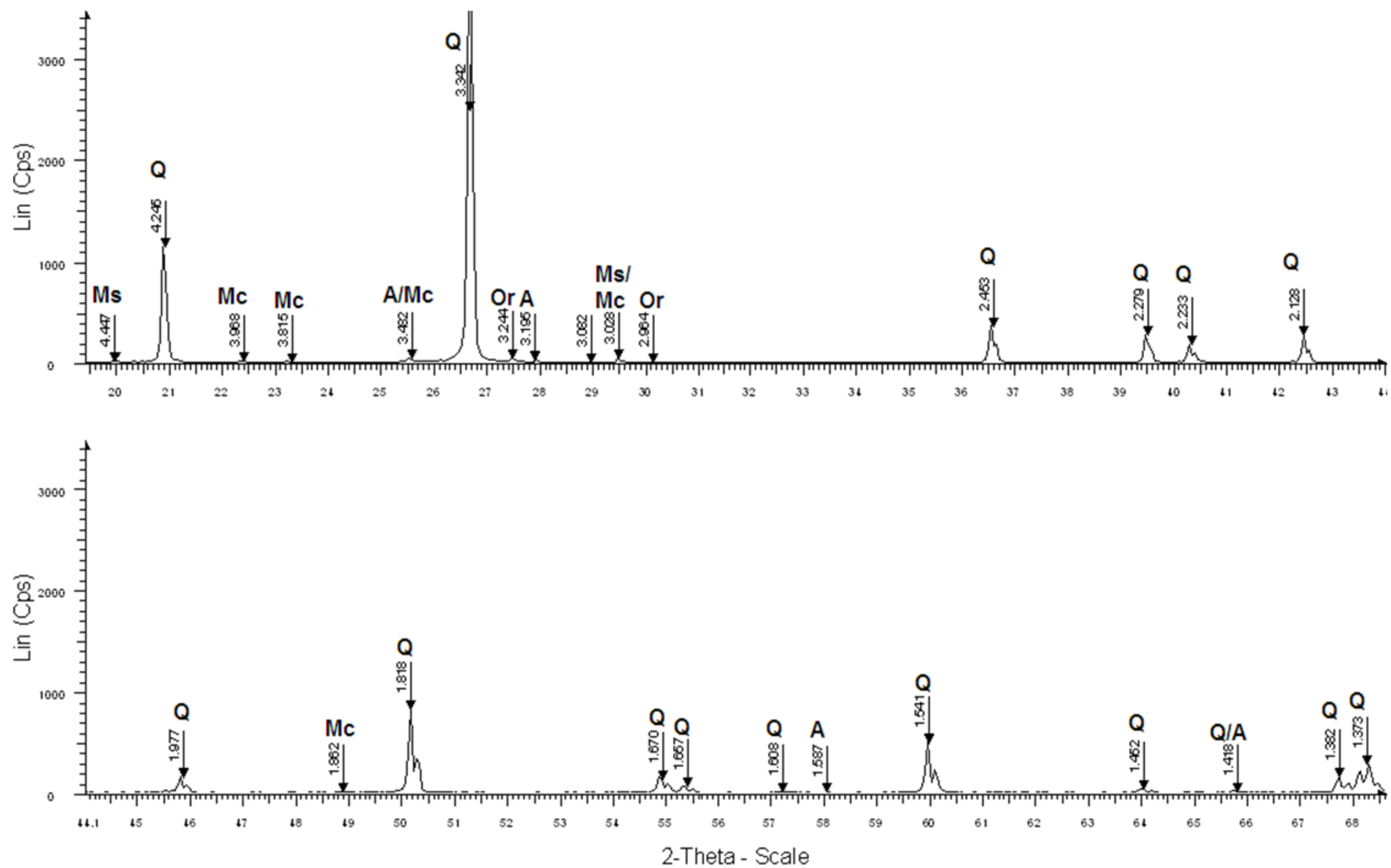

Fig. B-1. X-Ray diffractogram of the sand fraction of the particle size control section or upper 50 cm of the argillic horizon of a pimple mound summit (S11TX2890003). Units of d-spacing in Å. (Ms=muscovite, Q=quartz, Mc=microcline, A=albite, Or=orthoclase).

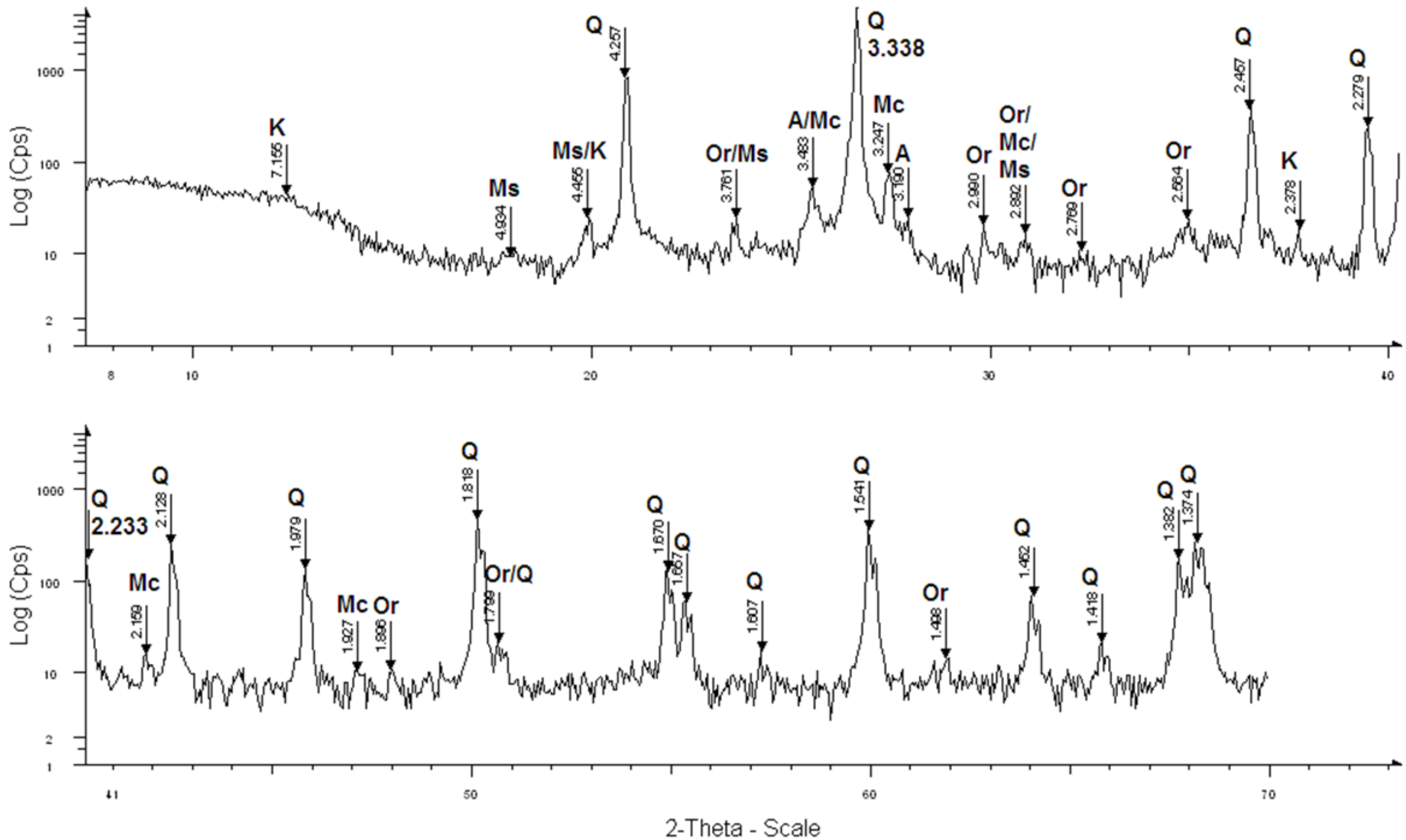

Fig. B-2. X-Ray diffractogram (logarithmic scale on the y-axis) for the silt fraction of the particle size control section or upper 50 cm of the argillic horizon of a pimple mound summit (S11TX2890003). Units of d-spacing in Å. (K=kaolinite, Ms=muscovite, Q=quartz, Mc=microcline, A=albite, Or=orthoclase).

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Derly taxadjunct PEDON NUMBER: S11TX2890004 1/25/2012
SOIL FAMILY: Chromic Vertic Endoaqualf; fine, smectitic, thermic
LOCATION: Middleton Quad, Leon County, Texas

LAB NO	DEPTH (cm)	HORIZON	PARTICLE SIZE DISTRIBUTION (mm) SAND VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	SILT FINE (0.02-0.002)	TOTAL (0.05-0.002)	CLAY FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	ORGN C %
			%												
7760	0-13	Ap	0.2	0.3	3.9	26.3	13.6	44.3	16.5	27.5	18.1	28.2	CL		1.81
7761	13-27	Btg1	0.0	0.2	3.7	25.0	14.6	43.5	16.6	25.9	21.3	30.6	CL		0.73
7762	27-41	Btg2	0.1	0.1	3.4	21.9	12.5	38.0	14.0	22.3	30.4	39.7	CL		0.53
7763	41-54	Btssg1	0.0	0.1	3.4	20.8	11.7	36.0	15.2	22.3	32.5	41.7	C		0.41
7764	54-83	Btssg2	0.1	0.1	3.3	20.8	11.4	35.7	15.6	23.2	31.9	41.1	C		0.38
7765	83-123	Btssg3	0.1	0.1	3.5	20.7	11.4	35.8	17.1	25.0	29.5	39.2	CL		0.33
7766	123-165	Btssg4	0.0	0.1	3.0	19.5	10.8	33.4	17.8	26.7	29.5	39.9	CL		0.26
7767	165-190	Btyg1	0.0	0.1	3.4	23.6	12.0	39.1	13.8	23.0	26.9	37.9	CL		0.19
7768	190-205	Btyg2	0.0	0.1	3.6	37.6	15.7	57.0	8.0	14.7	20.6	28.3	SCL		0.12
7769	205-233	B'tg	0.0	0.1	3.5	40.2	16.8	60.6	7.6	13.4	19.1	26.0	SCL		0.15
7770	233-257	BCtg	0.1	0.1	5.6	42.2	18.5	66.5	6.6	12.3	15.4	21.2	SCL		0.23
7771	257-284	CBtg	0.0	0.2	16.2	42.2	18.3	76.9	3.4	8.6	10.2	14.5	FSL		0.09
7772	284-308	Cg1	0.0	0.0	5.7	27.1	29.8	62.6	7.1	17.9	13.4	19.5	VFSL		0.11
7773	308-337	Cg2	0.0	0.0	0.8	23.7	36.1	60.6	7.2	21.7	11.4	17.7	VFSL		0.08

LAB NO	pH (H2O) 1:1	NH4OAc EXTR BASES CA	MG	NA	K	TOTAL	KCl EXTR AL	NaOAc CEC	ECEC	BASE SAT	ESP	SAR	CAL-CITE	DOLO-MITE	CACO3 EQ	GYP SUM
		Meq/100g								%			%			
7760	5.1	8.7	3.8	0.3	0.4	13.2	0.1	19.3	13.3	68	2					
7761	4.9	8.0	3.6	0.3	0.3	12.2	1.1	18.2	13.3	67	2					
7762	4.7	10.8	3.7	0.5	0.3	15.3	2.9	27.0	18.2	57	2					
7763	4.7	10.7	3.8	0.7	0.3	15.5	3.1	28.3	18.6	55	2					
7764	4.8	11.4	3.8	1.0	0.3	16.5	2.3	28.2	18.8	59	3	3				
7765	4.7	12.5	5.6	1.7	0.3	20.1	0.7	26.8	20.8	75	4	4				
7766	5.5	14.6	5.6	1.8	0.3	22.3	0.1	27.4		81	4	4				
7767	5.3	46.1	5.7	1.5	0.3	53.6	0.0	26.1		100	3	3				4.0
7768	5.5	12.3	3.7	1.0	0.3	17.3	0.0	17.4		99	3	2				0.0
7769	5.8	9.8	3.5	1.0	0.2	14.5		16.1		90	4	3				0.0
7770	6.3	8.1	3.1	0.8	0.2	12.2		13.5		90	4	3				
7771	6.5	4.7	2.0	0.6	0.1	7.4		8.6		86	4	3				
7772	7.1	7.9	3.2	0.8	0.2	12.1		12.1		100	4	3				
7773	7.1	6.9	3.1	0.8	0.2	11.0		11.5		96	4	3				

LAB NO	SATURATED PASTE EXTRACT ELEC COND dS/m	H2O CONT %	CA	MG	NA	K	HCO3	CL	S04	BULK DENSITY 0.33 BAR	OVEN DRY	COLE cm/cm	WATER CONTENT 0.33 BAR	15 BAR
			Meq/l							g/cc			WT%	
7760										1.33	1.60	0.064	29.9	
7761										1.43	1.69	0.057	26.2	
7762										1.33	1.77	0.100	32.6	
7763										1.34	1.79	0.101	31.4	
7764	0.6	58	1.2	0.5	3.0	0.1				1.35	1.88	0.117	32.3	
7765	1.8	60	6.5	2.5	8.7	0.2				1.36	1.96	0.130	34.1	
7766	2.8	62	14.5	5.8	12.2	0.2				1.40	1.97	0.121	31.8	
7767	3.4	60	23.5	7.4	11.7	0.2				1.35	1.80	0.101	33.4	
7768	3.1	52	23.0	6.6	8.3	0.2								
7769	1.7	49	7.5	2.5	7.0	0.2								
7770	1.9	44	10.0	3.2	7.3	0.2								
7771	1.6	35	6.5	2.6	6.4	0.2								
7772	1.5	43	6.5	2.6	6.5	0.2								
7773	1.7	43	6.5	3.0	7.1	0.2								

SOIL CHARACTERIZATION LABORATORY
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SOIL SERIES: Rader (correlated as Rodessa) PEDON NUMBER: S11TX2897001 11/18/2011
SOIL FAMILY: Aquic Glossudalf; fine, smectitic, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
	(cm)		%											%	
E3836	0-22	Ap	0.1	0.1	0.8	41.5	25.9	68.4	10.2	20.5	5.0	11.1	FSL		6.3
E3837	22-38	E	0.0	0.0	0.6	46.2	28.2	75.0	7.6	17.0	3.7	8.0	FSL		6.4
E3838	38-53	E/Bt	0.1	0.1	0.7	45.9	27.1	73.9	7.7	16.7	5.0	9.4	FSL		6.5
E3839	53-77	Btg1	0.0	0.1	0.7	31.3	15.7	47.8	7.4	12.2	30.7	40.0	SC		5.8
E3840	77-103	Btg2	0.0	0.0	0.7	38.8	17.6	57.1	7.4	11.9	23.3	31.0	SCL		5.4
E3841	103-132	Btg3	0.0	0.0	0.5	35.0	14.6	50.1	9.4	14.0	25.9	35.9	SC		6.7
E3842	132-152	Btkg	0.0	0.0	0.5	37.7	15.2	53.4	9.0	13.8	22.7	32.8	SCL	1	7.8
E3843	152-171	Btk1	0.1	0.1	0.5	34.1	15.2	50.0	11.8	17.4	21.7	32.6	SCL		7.9
E3844	171-184	Btk2	0.0	0.1	0.7	47.0	16.3	64.1	7.8	12.2	16.4	23.7	SCL		8.0
E3845	184-206	BCtg	0.0	0.0	0.8	47.0	23.7	71.5	4.4	9.0	14.0	19.5	FSL		8.0
E3846	206-222	CBg	0.0	0.0	0.5	38.6	31.5	70.6	5.4	11.8	12.8	17.6	VFSL		8.1
E3847	222-267	Cg	0.0	0.0	0.1	55.7	35.8	91.6	1.8	4.6	2.5	3.8	FS		7.5

SOIL SERIES: Rader (correlated as Austonio) PEDON NUMBER: S11TX2897002 11/18/2011
SOIL FAMILY: Typic Hapludalf; fine-loamy, siliceous, active, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
	(cm)		%											%	
E3848	0-21	Ap	0.0	0.1	0.9	42.2	28.6	71.8	9.5	19.3	3.9	8.9	FSL		5.8
E3849	21-32	A	0.1	0.0	0.6	44.3	30.2	75.2	8.2	17.3	3.4	7.5	VFSL		5.9
E3850	32-45	E1	0.1	0.1	0.8	46.1	31.2	78.3	7.6	16.4	1.7	5.3	LFS		6.1
E3851	45-55	E2	0.0	0.0	0.7	47.8	31.1	79.6	7.2	15.8	1.2	4.6	LFS		6.4
E3852	55-67	E3	0.1	0.1	0.7	47.3	31.0	79.2	6.9	16.4	1.4	4.4	LFS		6.1
E3853	67-85	E4	0.1	0.1	1.0	48.0	30.4	79.6	7.5	16.2	1.4	4.2	LFS		6.7
E3854	85-110	Bt	0.1	0.0	0.5	42.0	27.5	70.1	7.0	15.0	8.7	14.9	FSL		7.2
E3855	110-135	Btg1	0.0	0.0	0.7	37.5	22.0	60.2	5.8	10.9	20.8	28.9	SCL		7.3
E3856	135-159	Btg2	0.0	0.0	0.6	32.5	17.1	50.2	6.3	11.0	30.2	38.8	SC		7.8
E3857	159-195	B't1	0.0	0.0	0.7	36.4	16.4	53.5	7.8	12.4	23.6	34.1	SCL		8.3
E3858	195-221	B't2	0.0	0.0	0.8	43.6	20.6	65.0	5.8	10.0	17.4	25.0	SCL		8.3
E3859	221-251	BCt	0.0	0.0	0.2	37.6	38.2	76.0	2.7	7.0	12.9	17.0	VFSL		7.5
E3860	251-261	Cg	0.0	0.0	0.2	40.8	40.7	81.7	2.8	6.5	8.6	11.8	VFSL		7.5

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SOIL SERIES: Rader (correlated as Yeaton) PEDON NUMBER: S11TX2897003 11/18/2011
SOIL FAMILY: Aquic Hapludalf; fine-loamy, siliceous, active, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm) SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
			%											%	
E3861	0-16	Ap	0.0	0.1	0.9	36.3	23.4	60.7	13.2	21.4	9.3	17.9	FSL		6.7
E3862	16-29	A	0.0	0.0	0.6	38.2	25.6	64.4	11.0	19.6	8.7	16.0	FSL		7.2
E3863	29-44	E	0.0	0.1	0.6	46.0	30.5	77.2	7.2	16.9	2.8	5.9	LFS		7.4
E3864	44-63	Bt1	0.0	0.0	0.7	42.8	27.7	71.2	7.0	15.6	8.7	13.2	FSL		7.6
E3865	63-96	Bt2	0.1	0.1	1.0	33.3	22.3	56.8	6.9	13.0	22.3	30.2	SCL		8.0
E3866	96-125	Bt3	0.0	0.0	0.4	28.5	19.0	47.9	7.6	12.5	30.9	39.6	SC		7.9
E3867	125-144	Btk	0.0	0.0	0.5	34.8	18.4	53.7	7.8	12.0	25.6	34.3	SCL		8.1
E3868	144-175	Btkg	0.0	0.0	0.4	35.9	17.2	53.5	8.2	13.4	23.5	33.1	SCL	3	8.2
E3869	175-198	Btg1	0.0	0.0	0.9	32.3	19.6	52.8	10.3	16.0	20.6	31.2	SCL	1	8.0
E3870	198-220	Btg2	0.1	0.1	0.9	35.2	29.2	65.5	6.6	12.5	14.8	22.0	SCL		8.1
E3871	220-238	Btg3	0.0	0.0	0.2	29.6	37.8	67.6	5.9	13.2	13.0	19.2	VFSL		8.2
E3872	238-251	BCtg	0.0	0.0	0.2	24.7	39.6	64.5	6.4	17.2	12.2	18.3	VFSL		7.4
E3873	251-275	Cg	0.0	0.0	0.3	52.6	37.5	90.4	1.8	4.5	3.1	5.1	FS		7.1

SOIL SERIES: Derly taxadjunct PEDON NUMBER: S11TX2897004 11/18/2011
SOIL FAMILY: Typic Endoaqualf; fine-loamy, siliceous, active, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm) SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
			%											%	
E3874	0-5	A	0.0	0.2	2.5	27.7	18.9	49.3	16.5	31.4	9.3	19.3	L	1	5.3
E3875	5-23	Ap	0.0	0.0	1.0	32.3	23.0	56.3	14.8	23.5	11.8	20.2	SCL		5.6
E3876	23-39	BAg	0.1	0.1	0.4	26.4	20.1	47.1	14.6	23.1	20.1	29.8	SCL		6.0
E3877	39-60	Btg1	0.0	0.0	0.4	25.9	18.9	45.2	12.9	20.0	25.3	34.8	SCL		5.9
E3878	60-74	Btg2	0.0	0.0	0.3	29.7	19.8	49.8	12.9	19.8	21.9	30.4	SCL		6.2
E3879	74-98	Btg3	0.0	0.0	0.4	28.7	19.3	48.4	13.8	20.0	22.1	31.6	SCL		6.7
E3880	98-125	Btg4	0.0	0.0	0.2	30.4	18.5	49.1	11.9	18.3	22.9	32.6	SCL		7.5
E3881	125-146	Btg5	0.0	0.0	0.2	29.7	22.4	52.3	10.8	17.0	21.3	30.7	SCL		7.7
E3882	146-173	Btg6	0.0	0.1	0.3	21.2	19.6	41.2	14.2	21.3	24.2	37.5	CL		7.6
E3883	173-194	Btg7	0.1	0.1	0.3	26.6	27.2	54.3	9.8	17.7	19.6	28.0	SCL		7.9
E3884	194-218	Btg8	0.1	0.1	0.2	26.3	36.4	63.1	6.6	13.6	16.5	23.3	SCL		8.1
E3885	218-262	BCg	0.0	0.0	0.2	40.5	36.2	76.9	4.3	8.8	9.6	14.3	VFSL		8.2
E3886	262-296	Cg	0.0	0.0	0.1	56.2	34.1	90.4	1.6	5.2	2.5	4.4	FS		8.2

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SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2897005 11/18/2011
SOIL FAMILY: Vertic Epiaqualf; Fine, smectitic, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E3914	0-18	Ap	0.0	0.1	0.9	39.4	24.4	64.8	11.7	23.3	5.8	11.9	FSL		6.8
E3915	18-39	A	0.0	0.0	0.7	46.5	25.0	72.2	9.0	19.2	4.1	8.6	FSL		6.6
E3916	39-51	E	0.0	0.0	0.6	48.3	26.2	75.1	8.9	18.7	2.8	6.2	FSL		7.0
E3917	51-69	Btg	0.1	0.0	1.3	32.0	15.8	49.2	8.0	14.1	28.3	36.7	SC		6.1
E3918	69-99	Btss	0.0	0.0	0.3	27.5	12.6	40.4	10.3	16.5	31.2	43.1	C		6.3
E3919	99-125	Bt	0.0	0.0	0.2	27.1	12.9	40.2	13.1	19.4	28.5	40.4	C		7.6
E3920	125-143	Btk	0.0	0.0	0.5	31.5	15.2	47.2	12.7	19.5	22.9	33.3	SCL	2	8.0
E3921	143-183	Btkg1	0.0	0.0	0.3	27.6	15.8	43.7	13.1	19.3	23.9	37.0	CL	4	8.0
E3922	183-212	Btkg2	0.1	0.1	0.4	29.2	12.6	42.4	15.6	23.8	20.9	33.8	CL	1	8.0
E3923	212-230	Btkg3	0.1	0.0	0.3	27.2	19.2	46.8	12.4	20.4	20.0	32.8	SCL		8.0
E3924	230-244	CBg1	0.1	0.1	0.5	18.0	17.0	35.7	14.8	33.2	17.4	31.1	CL		8.0
E3925	244-259	CBg2	0.0	0.1	0.4	37.0	21.6	59.1	9.1	16.8	16.0	24.1	SCL		7.7
E3926	259-275	Cg	0.1	0.1	2.3	79.9	9.3	91.7	1.6	1.9	4.3	6.4	FS		7.6

SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2897006 11/18/2011
SOIL FAMILY: Aquic Arenic Hapludalf; fine-loamy, siliceous, superactive, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E3927	0-17	Ap	0.0	0.3	1.0	48.5	26.1	75.9	8.5	19.2	1.5	4.9	LFS		5.5
E3928	17-39	A	0.1	0.2	1.1	48.3	26.2	75.9	8.1	18.8	2.0	5.3	LFS		5.4
E3929	39-55	E	0.1	0.1	0.4	49.4	26.6	76.6	8.8	18.9	1.5	4.5	LFS		6.0
E3930	55-74	Bt1	0.0	0.0	0.5	47.3	24.2	72.0	6.4	16.8	7.2	11.2	FSL		7.1
E3931	74-111	Bt2	0.1	0.0	0.4	29.0	11.9	41.4	9.9	15.2	32.0	43.4	C		7.6
E3932	111-141	Btk1	0.0	0.0	0.4	39.2	15.3	54.9	8.7	14.3	21.4	30.8	SCL		8.2
E3933	141-152	Btk2	0.0	0.1	0.4	38.8	14.0	53.3	8.2	13.8	23.1	32.9	SCL	4	8.2
E3934	152-180	Btk3	0.3	0.2	0.5	37.4	11.9	50.3	9.2	14.1	25.0	35.6	SC	2	8.2
E3935	180-195	BCtk	0.5	0.4	0.7	42.1	11.8	55.5	9.6	14.7	19.5	29.8	SCL	3	8.3
E3936	195-219	BCtg	0.2	0.1	0.5	40.8	19.7	61.3	8.6	15.5	10.5	23.2	SCL		8.4
E3937	219-242	CBtg	0.0	0.0	0.4	38.6	28.6	67.6	5.6	12.9	9.2	19.5	FSL		7.8
E3938	242-252	Cg	0.0	0.0	1.2	67.5	16.7	85.4	2.0	4.0	8.0	10.6	LFS		8.1
E3939	252-285	C	0.0	0.0	0.7	79.2	10.6	90.5	0.9	1.3	6.6	8.2	FS		7.7

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2897007 11/18/2011
SOIL FAMILY: Oxyaquic Vertic Glossudalf; fine-loamy, siliceous, superactive, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
			VC	C	M	F	VF	TOTAL	FINE	TOTAL	FINE	TOTAL		COARSE	pH
LAB			(2.0-	(1.0-	(0.5-	(0.25-	(0.10-	(2.0-	(0.02-	(0.05-			TEXTURE	FRAG-	(H2O)
NO	DEPTH	HORIZON	1.0)	0.5)	0.25)	0.10)	0.05)	0.05)	0.002)	0.002)	(<0.0002)	(<0.002)	CLASS	MENTS	1:1
	(cm)		%											%	
E3940	0-21	Ap	0.1	0.2	0.9	49.7	26.1	77.0	7.7	18.1	1.9	4.9	LFS		5.9
E3941	21-31	A	0.2	0.0	0.4	48.6	25.8	75.0	7.9	16.9	4.4	8.1	FSL		7.1
E3942	31-48	Bt/E	0.0	0.1	0.6	45.4	22.4	68.5	7.8	15.4	11.4	16.1	FSL		7.2
E3943	48-66	Bt1	0.3	0.1	0.6	35.1	15.0	51.1	9.7	14.8	24.0	34.1	SCL		7.5
E3944	66-87	Bt2	0.0	0.0	0.4	28.9	13.5	42.8	9.7	14.6	31.5	42.6	C		7.8
E3945	87-120	Btss	0.1	0.0	0.3	29.5	12.9	42.8	10.2	15.6	30.6	41.6	C		7.9
E3946	120-143	Btssg	0.0	0.0	0.3	32.3	12.4	45.0	9.7	14.5	29.6	40.5	SC		7.9
E3947	143-165	B't	0.0	0.0	0.3	31.7	13.7	45.7	10.5	15.5	27.6	38.8	SC		7.9
E3948	165-186	Btg	0.4	0.2	0.5	32.4	14.5	48.0	10.8	15.7	24.8	36.3	SC		8.1
E3949	186-205	BCkg	0.5	0.4	0.5	33.1	14.7	49.2	11.6	17.6	17.6	33.2	SCL		8.1
E3950	205-239	CBkg	0.1	0.2	0.4	37.8	22.5	61.0	12.8	19.2	3.0	19.8	FSL		8.3
E3951	239-262	Cg1	0.4	0.4	0.9	44.8	28.6	75.1	9.0	14.1	1.7	10.8	FSL		8.3
E3952	262-280	Cg2	0.3	0.5	2.5	43.5	32.7	79.5	3.9	10.3	4.0	10.2	VFSL		8.3

SOIL SERIES: Derly taxadjunct PEDON NUMBER: S11TX2897008 11/18/2011
SOIL FAMILY: Typic Argiaquoll; fine-loamy, siliceous, active, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
			VC	C	M	F	VF	TOTAL	FINE	TOTAL	FINE	TOTAL		COARSE	pH
LAB			(2.0-	(1.0-	(0.5-	(0.25-	(0.10-	(2.0-	(0.02-	(0.05-			TEXTURE	FRAG-	(H2O)
NO	DEPTH	HORIZON	1.0)	0.5)	0.25)	0.10)	0.05)	0.05)	0.002)	0.002)	(<0.0002)	(<0.002)	CLASS	MENTS	1:1
	(cm)		%											%	
E3953	0-19	Ap	0.0	0.3	1.1	33.5	14.7	49.6	17.5	26.5	13.7	23.9	SCL		5.6
E3954	19-39	A	0.0	0.1	0.5	26.2	12.4	39.2	18.8	25.8	22.2	35.0	CL		5.6
E3955	39-58	Btg1	0.0	0.1	0.4	31.9	15.8	48.2	15.2	22.4	19.2	29.4	SCL		5.9
E3956	58-78	Btg2	0.0	0.1	0.5	36.9	15.0	52.5	12.6	19.9	17.0	27.6	SCL		7.1
E3957	78-102	Btg3	0.1	0.1	0.3	35.0	13.7	49.2	13.2	18.9	21.2	31.9	SCL		7.7
E3958	102-132	Btkg	0.0	0.1	0.4	34.9	14.9	50.3	11.8	17.1	21.5	32.6	SCL	3	7.9
E3959	132-157	B'tg1	0.2	0.0	0.2	25.8	13.1	39.3	15.7	22.4	23.1	38.3	CL		7.8
E3960	157-175	B'tg2	0.0	0.0	0.2	19.7	23.5	43.4	14.8	24.2	18.5	32.4	CL		7.6
E3961	175-191	B'tg3	0.0	0.0	0.5	37.9	26.3	64.7	6.6	15.3	12.5	20.0	FSL		7.7
E3962	191-230	Cg	0.0	0.0	2.8	71.0	18.4	92.2	0.8	1.4	4.5	6.4	FS		7.6

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SOIL SERIES: Derly (correlated as Yeaton) PEDON NUMBER: S11TX2897009 11/18/2011
SOIL FAMILY: Aquic Hapludalf; fine-loamy, siliceous, active, thermic
LOCATION: Stanmire Lake Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAGMENTS %	pH (H2O) 1:1
			%												
E3963	0-16	Ap	0.0	0.2	1.0	36.3	17.9	55.4	12.8	22.0	12.5	22.6	SCL		5.4
E3964	16-36	A	0.1	0.1	0.8	36.4	18.6	56.0	13.5	21.6	12.3	22.4	SCL		5.4
E3965	36-55	AB	0.0	0.1	0.5	35.4	18.8	54.8	13.5	21.5	13.8	23.7	SCL		5.5
E3966	55-76	Bt	0.0	0.0	0.4	33.3	18.5	52.2	11.7	19.1	19.2	28.7	SCL		5.4
E3967	76-100	Btg	0.0	0.1	0.5	36.9	17.5	55.0	10.4	17.4	19.4	27.6	SCL		5.1
E3968	100-118	B't	0.0	0.0	0.4	35.3	16.6	52.3	9.5	16.1	21.8	31.6	SCL		4.9
E3969	118-141	B'tg	0.0	0.0	0.5	36.5	15.4	52.4	9.4	17.2	21.0	30.4	SCL		4.9
E3970	141-173	BCtg	0.0	0.0	0.5	41.6	18.3	60.4	8.8	15.9	16.6	23.7	SCL		5.2
E3971	173-201	CBg	0.0	0.0	0.6	43.7	23.7	68.0	5.9	13.3	13.4	18.7	FSL		5.3
E3972	201-226	Cg1	0.0	0.0	0.7	64.5	19.7	84.9	2.6	4.9	7.4	10.2	LFS		5.7
E3973	226-239	Cg2	0.0	0.0	0.2	55.4	31.8	87.4	2.6	6.2	3.7	6.4	LFS		6.2

SOIL SERIES: Derly (correlated as Sawtown) PEDON NUMBER: S11TX2897010 11/18/2011
SOIL FAMILY: Aquic Glossudalf; fine-loamy, siliceous, active, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAGMENTS %	pH (H2O) 1:1
			%												
E3984	0-14	Ap	0.2	0.5	2.2	21.0	24.8	48.7	20.1	38.9	6.1	12.4	L		5.2
E3985	14-32	Bt/E	0.1	0.3	1.8	18.5	23.2	43.9	17.7	33.0	15.6	23.1	L		5.1
E3986	32-59	Bt1	0.0	0.2	1.5	15.4	20.5	37.6	17.5	31.8	20.9	30.6	CL		5.6
E3987	59-96	Bt2	0.1	0.2	1.4	15.3	21.4	38.4	17.4	30.9	21.1	30.7	CL		7.7
E3988	96-133	Bt3	0.0	0.3	2.5	27.0	30.0	59.8	9.3	21.4	12.8	18.8	VFSL		8.1
E3989	133-162	Bt4	0.0	0.1	0.6	12.7	36.0	49.4	9.7	24.1	18.5	26.5	SCL		7.9
E3990	162-190	Bt5	0.0	0.0	0.1	7.9	32.6	40.6	12.2	28.9	20.0	30.5	CL		7.9
E3991	190-213	Bt6	0.0	0.0	0.2	11.2	37.9	49.3	10.0	24.6	17.0	26.1	SCL		8.0
E3992	213-236	BC	0.0	0.0	0.2	11.0	50.7	61.9	6.4	20.4	11.2	17.7	VFSL		8.1
E3993	236-263	C1	0.0	0.0	0.1	5.0	33.2	38.3	14.2	32.5	16.3	29.2	CL		8.0
E3994	263-316	C2	0.0	0.1	0.1	12.4	49.1	61.7	8.5	20.8	9.6	17.5	VFSL		8.5
E3995	316-336	C3	0.0	0.0	0.6	88.1	7.4	96.1	0.6	1.4	1.7	2.5	FS		8.2

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SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2897011 11/18/2011
SOIL FAMILY: Haplic Glossudalf; fine, smectitic, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E3996	0-18	Ap	0.0	0.2	1.9	26.4	37.0	65.5	12.1	29.0	2.2	5.5	VFSL	1	5.5
E3997	18-39	E	0.0	0.2	1.5	25.4	37.3	64.4	11.9	28.9	3.3	6.7	VFSL		5.0
E3998	39-46	Bt/E	0.0	0.1	1.1	18.6	26.8	46.6	12.1	25.5	20.3	27.9	SCL		5.1
E3999	46-61	Bt1	0.0	0.0	0.5	11.0	16.2	27.7	9.8	19.2	44.2	53.1	C		4.8
E4000	61-91	Bt2	0.0	0.0	0.3	12.3	23.4	36.0	12.0	25.8	29.3	38.2	CL		5.1
E4001	91-132	Btk1	0.0	0.0	1.0	29.6	21.8	52.4	9.1	18.3	21.6	29.3	SCL		7.9
E4002	132-163	Btk2	0.0	0.0	1.0	36.2	26.8	64.0	6.5	15.7	14.2	20.3	SCL	1	8.1
E4003	163-197	B't1	0.0	0.0	0.2	10.4	50.6	61.2	6.8	20.1	11.5	18.7	VFSL		8.1
E4004	197-208	B't2	0.0	0.0	0.1	4.0	31.0	35.1	15.7	32.9	18.5	32.0	CL		8.0
E4005	208-222	BCt	0.0	0.0	0.1	6.6	50.1	56.8	8.1	23.1	11.6	20.1	SCL		8.2
E4006	222-244	CBt	0.0	0.0	0.1	3.4	40.7	44.2	13.0	30.1	15.3	25.7	L		8.5
E4007	244-266	C1	0.0	0.0	0.1	14.0	59.3	73.4	4.7	16.2	6.0	10.4	VFSL	3	8.9
E4008	266-312	C2	0.1	0.0	0.1	14.6	57.6	72.4	5.8	17.6	5.4	10.0	VFSL		9.1
E4009	312-330	C3	0.0	0.0	0.1	41.4	40.8	82.3	3.0	11.3	3.8	6.4	LFS		9.1

SOIL SERIES: Rader (correlated as Gallime) PEDON NUMBER: S11TX2897012 11/18/2011
SOIL FAMILY: Glossic Paleudalf; coarse-loamy, siliceous, active, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4010	0-19	Ap	0.2	0.2	1.5	25.4	38.6	65.9	11.4	28.9	2.1	5.2	VFSL	1	5.6
E4011	19-42	E1	0.1	0.2	1.3	26.0	39.0	66.6	10.7	28.1	2.1	5.3	VFSL	1	6.0
E4012	42-67	E2	0.1	0.1	1.3	26.0	39.7	67.2	10.7	27.3	2.6	5.5	VFSL	1	5.9
E4013	67-94	E3	0.1	0.1	1.2	25.1	39.1	65.6	10.4	27.0	4.3	7.4	VFSL	1	4.7
E4014	94-113	E/Bt	0.2	0.2	1.4	25.2	39.0	66.0	10.2	25.9	4.4	8.1	VFSL	1	4.8
E4015	113-150	Bt1	0.0	0.1	0.5	12.8	25.4	38.8	9.0	20.3	32.3	40.9	C		4.7
E4016	150-190	Bt2	0.0	0.0	0.3	17.6	28.7	46.6	9.1	21.3	24.6	32.1	SCL		4.8
E4017	190-212	Bt3	0.0	0.0	0.5	22.9	35.1	58.5	7.8	18.7	16.5	22.8	SCL		6.4
E4018	212-240	Bt4	0.0	0.0	0.2	14.2	40.5	54.9	8.6	21.4	15.8	23.7	SCL		7.5
E4019	240-264	BCt	0.0	0.0	0.2	14.6	55.3	70.1	5.5	15.0	9.9	14.9	VFSL		7.9
E4020	264-295	CBt	0.1	0.1	0.3	19.4	40.2	60.1	8.4	21.8	11.1	18.1	VFSL		8.4
E4021	295-319	C1	0.0	0.0	0.2	39.6	38.8	78.6	3.7	11.6	5.9	9.8	VFSL		8.6
E4022	319-340	C2	0.0	0.2	0.3	39.5	40.1	80.1	4.0	11.7	4.4	8.2	LFS		8.9

SOIL CHARACTERIZATION LABORATORY
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SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2897013 11/21/2011
SOIL FAMILY: Haplic Glossudalf; fine-loamy, siliceous, superactive, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
			%											%	
E4023	0-20	Ap	0.0	0.2	1.3	26.3	38.1	65.9	12.4	28.3	3.0	5.8	VFSL	1	5.0
E4024	20-39	E1	0.1	0.2	1.1	26.5	38.9	66.8	12.1	27.1	3.0	6.1	VFSL	1	4.9
E4025	39-66	E2	0.3	0.3	1.2	22.1	34.2	58.1	11.4	24.1	12.9	17.8	VFSL		5.2
E4026	66-101	Bt/E	0.0	0.2	0.8	16.4	27.5	44.9	12.0	22.8	24.3	32.3	CL		5.2
E4027	101-128	Bt	0.1	0.1	0.7	15.3	26.6	42.8	12.5	23.7	25.7	33.5	CL		5.3
E4028	128-159	Btss	0.0	0.1	0.5	13.8	27.0	41.4	13.0	23.4	26.7	35.2	CL		6.1
E4029	159-189	Btk1	0.0	0.0	0.4	12.1	25.5	38.0	14.3	24.2	27.8	37.8	CL		7.2
E4030	189-218	Btk2	0.0	0.0	0.2	19.3	36.9	56.4	8.3	16.1	19.3	27.5	SCL		7.8
E4031	218-242	B't	0.0	0.0	0.1	15.7	37.9	53.7	8.6	21.3	16.9	25.0	SCL		7.9
E4032	242-263	BCtk	0.1	0.0	0.3	32.9	34.5	67.8	6.3	14.2	11.6	18.0	VFSL		8.5
E4033	263-305	CB	0.0	0.0	0.0	26.4	52.7	79.1	2.9	8.4	8.7	12.5	VFSL		8.5
E4034	305-365	C1	0.4	0.3	0.2	30.5	49.1	80.5	2.7	10.4	5.8	9.1	LFS	1	8.8
E4035	365-375	C2	0.2	0.1	0.4	55.2	32.4	88.3	1.6	5.5	3.8	6.2	FS	1	8.6

SOIL SERIES: Derly (correlated as Yeaton) PEDON NUMBER: S11TX2897014 11/21/2011
SOIL FAMILY: Aquic Hapludalf; fine, smectitic, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
			%											%	
E4036	0-18	Ap	0.2	0.4	0.9	16.8	24.1	42.4	25.9	40.0	10.0	17.6	L		5.2
E4037	18-32	Bt	0.0	0.1	0.6	13.5	20.3	34.5	22.5	34.1	23.0	31.4	CL		4.8
E4038	32-53	Btg1	0.0	0.1	0.6	13.8	19.6	34.1	19.5	29.7	27.4	36.2	CL		4.8
E4039	53-82	Btg2	0.0	0.1	0.5	13.7	19.2	33.5	19.5	29.4	26.6	37.1	CL		5.3
E4040	82-98	Btg3	0.0	0.0	0.3	13.3	19.7	33.3	19.2	28.1	26.6	38.6	CL		6.8
E4041	98-119	Btk1	0.0	0.0	0.2	12.8	20.7	33.7	17.5	26.2	27.8	40.1	C		7.4
E4042	119-148	Btk2	0.0	0.0	0.1	13.8	20.5	34.4	16.3	25.3	27.5	40.3	C		7.6
E4043	148-180	Btk3	0.0	0.0	0.2	20.8	24.7	45.7	11.8	20.4	23.4	33.9	SCL		7.8
E4044	180-206	Btkg	0.0	0.1	0.1	19.8	25.7	45.7	11.5	23.8	19.8	30.5	SCL		8.0
E4045	206-244	B'tg	0.3	0.3	0.3	21.1	29.9	51.9	9.5	20.2	18.8	27.9	SCL		8.2
E4046	244-275	Cg	0.1	0.1	0.1	43.3	29.6	73.2	3.9	7.9	13.3	18.9	FSL		8.5
E4047	275-310	Ck	0.3	0.3	0.3	62.1	18.1	81.1	3.6	7.8	6.6	11.2	FSL		8.6

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Derly (correlated as Freestone) PEDON NUMBER: S11TX2897015 11/21/2011
SOIL FAMILY: Glossaquic Paleudalf; fine-loamy, siliceous, semiactive, thermic
LOCATION: Leona Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4048	0-19	Ap	0.5	0.4	2.0	26.5	22.6	52.0	21.0	39.8	3.7	8.2	FSL	1	6.6
E4049	19-35	Bt/E	0.7	0.3	1.3	19.8	17.9	40.0	18.9	31.8	19.9	28.2	CL	2	5.6
E4050	35-59	Bt1	0.3	0.2	1.4	19.9	17.8	39.6	15.1	26.8	25.2	33.6	CL		4.9
E4051	59-91	Bt2	0.3	0.3	1.5	20.1	18.1	40.3	16.2	28.5	23.1	31.2	CL		5.6
E4052	91-113	Bt3	0.2	0.1	1.2	20.7	18.1	40.3	14.6	25.1	25.5	34.6	CL		6.5
E4053	113-140	Bt4	0.1	0.1	1.1	21.3	18.5	41.1	16.9	27.7	22.2	31.2	CL		6.9
E4054	140-178	Btg	0.0	0.1	0.8	22.4	19.5	42.8	13.3	23.6	25.1	33.6	CL		6.7
E4055	178-220	Btv	0.5	0.4	0.8	28.9	24.7	55.3	9.1	19.1	18.3	25.6	SCL		6.4
E4056	220-260	BCtg	0.1	0.1	0.5	25.7	32.1	58.5	8.2	20.6	15.3	20.9	SCL	8	6.3
E4057	260-280	CB	0.2	0.1	0.8	33.2	28.1	62.4	9.0	18.8	13.5	18.8	FSL		6.7

SOIL SERIES: Rader (correlated as Freestone) PEDON NUMBER: S11TX2897016 12/09/2011
SOIL FAMILY: Glossaquic Paleudalf; fine-loamy, siliceous, semiactive, thermic
LOCATION: Leona Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4078	0-15	Ap	0.1	0.3	2.2	32.5	30.5	65.6	12.2	30.0	2.1	4.4	VFSL	1	7.0
E4079	15-38	E1	0.1	0.2	1.6	32.4	30.3	64.6	12.3	29.2	2.9	6.2	VFSL		7.0
E4080	38-68	E2	0.1	0.1	1.4	29.9	28.9	60.4	12.8	30.0	5.2	9.6	FSL		5.3
E4081	68-101	Bt/E	0.0	0.2	1.4	23.0	23.1	47.7	13.8	28.4	15.2	23.9	L		4.4
E4082	101-118	Bt1	0.2	0.2	2.1	17.5	14.4	34.4	10.5	19.4	39.0	46.2	C	1	4.3
E4083	118-149	Bt2	0.2	0.2	1.2	16.0	15.4	33.0	12.3	22.9	36.2	44.1	C		4.5
E4084	149-169	Bt3	0.2	0.1	1.0	17.9	17.6	36.8	13.4	24.4	31.0	38.8	CL		4.8
E4085	169-189	Bt4	0.0	0.1	1.1	21.0	19.1	41.3	13.1	24.4	26.1	34.3	CL		5.0
E4086	189-208	Bt5	0.0	0.1	1.0	23.5	21.6	46.2	11.6	22.2	23.4	31.6	SCL		5.1
E4087	208-243	Btv1	0.0	0.1	1.0	37.4	20.7	59.2	7.3	16.7	17.3	24.1	SCL		5.6
E4088	243-263	Btv2	0.3	0.2	1.0	39.3	22.4	63.2	7.4	16.9	13.3	19.9	FSL		6.4
E4089	263-285	B't	0.0	0.0	1.0	43.3	21.9	66.2	6.5	15.6	13.0	18.2	FSL		6.5
E4090	285-320	BC	0.0	0.0	9.9	64.8	8.1	82.8	1.9	3.1	11.1	14.1	FSL		6.7
E4091	320-363	CB	0.1	0.1	8.0	55.7	14.6	78.5	3.7	7.4	10.8	14.1	FSL		6.7
E4092	363-399	C1	0.0	0.0	4.5	69.6	14.5	88.6	1.4	2.7	7.4	8.7	LFS		6.4
E4093	399-432	C2	0.0	0.1	10.5	73.3	7.6	91.5	0.8	1.5	5.3	7.0	FS		6.6

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Rader (correlated as Gallime) PEDON NUMBER: S11TX2897017 12/9/2011
SOIL FAMILY: Glossic Paleudalf; fine-loamy, siliceous, semiactive, thermic
LOCATION: Leona Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
			%											%	
E4094	0-18	Ap	0.1	0.3	2.2	32.2	31.8	66.6	11.7	29.1	2.1	4.3	VFSL	1	7.1
E4095	18-45	E1	0.1	0.1	1.1	31.8	33.3	66.4	10.9	28.8	2.2	4.8	VFSL		7.4
E4096	45-77	E2	0.3	0.2	1.8	32.6	30.6	65.5	10.5	27.6	3.7	6.9	VFSL		7.2
E4097	77-111	E/Bt	0.4	0.3	1.5	27.1	26.8	56.1	10.2	24.8	14.3	19.1	FSL		4.4
E4098	111-143	Bt/E	0.2	0.2	1.5	26.7	24.0	52.6	12.7	26.7	15.0	20.7	SCL		4.6
E4099	143-160	Bt1	0.3	0.2	2.3	22.4	17.4	42.6	10.9	20.4	29.8	37.0	CL		4.8
E4100	160-183	Bt2	0.3	0.1	1.5	18.2	14.6	34.7	11.1	18.8	38.3	46.5	C		4.6
E4101	183-217	Bt3	0.1	0.1	1.0	21.0	17.8	40.0	12.7	22.1	29.6	37.9	CL		4.8
E4102	217-238	Bt4	0.0	0.0	0.9	25.1	20.6	46.6	12.1	21.2	24.2	32.2	SCL		4.9
E4103	238-258	Btv1	0.0	0.0	0.7	27.4	22.5	50.6	10.6	19.5	22.1	29.9	SCL		5.0
E4104	258-284	Btv2	0.1	0.0	0.4	33.8	26.9	61.2	8.3	16.7	16.4	22.1	SCL		5.4
E4105	284-313	BCt1	0.0	0.0	0.8	43.4	23.1	67.3	6.4	12.6	14.8	20.1	SCL		5.7
E4106	313-353	BCt2	0.0	0.0	2.7	59.2	15.2	77.1	3.7	7.1	11.9	15.8	FSL		5.9
E4107	353-393	C1	0.0	0.0	7.0	62.8	10.4	80.2	2.8	4.6	12.0	15.2	FSL		5.9
E4108	393-432	C2	0.0	0.5	20.2	52.3	8.1	81.1	2.3	4.1	12.3	14.8	FSL		5.7
E4109	432-500	Cg	0.0	1.2	25.6	44.5	10.3	81.6	3.5	6.5	9.0	11.9	FSL		5.8

SOIL SERIES: Rader (correlated as Gallime) PEDON NUMBER: S11TX2897018 12/9/2011
SOIL FAMILY: Glossic Paleudalf; fine-loamy, siliceous, semiactive, thermic
LOCATION: Leona Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS	pH (H2O) 1:1
			%											%	
E4110	0-17	Ap	0.5	0.4	2.1	33.8	30.0	66.8	11.2	28.7	1.8	4.5	VFSL		6.6
E4111	17-38	E1	0.1	0.2	1.6	31.9	31.5	65.3	11.2	28.9	2.5	5.8	VFSL	1	7.2
E4112	38-59	E2	0.1	0.1	1.6	32.5	30.5	64.8	10.8	27.3	4.2	7.9	VFSL		7.3
E4113	59-78	E/Bt	0.2	0.1	1.0	29.1	31.2	61.6	10.9	27.8	6.3	10.6	VFSL		5.6
E4114	78-103	Bt/E	0.2	0.2	2.0	29.0	27.7	59.1	10.5	25.2	10.8	15.7	FSL	1	4.4
E4115	103-133	Btg	0.2	0.2	1.8	23.6	20.0	45.8	10.9	23.7	24.5	30.5	SCL	5	4.6
E4116	133-149	Bt1	0.5	0.4	3.2	21.4	15.6	41.1	10.1	19.9	31.8	39.0	CL	4	4.8
E4117	149-183	Bt2	0.0	0.1	1.7	21.1	16.6	39.5	11.0	20.1	33.1	40.4	C		5.0
E4118	183-208	Bt3	0.0	0.1	1.5	23.1	17.6	42.3	13.7	24.2	26.1	33.5	CL		5.3
E4119	208-244	Bt4	0.0	0.0	1.2	23.3	18.9	43.4	14.7	25.3	23.4	31.3	CL		5.7
E4120	244-284	B'tg	0.0	0.0	1.0	34.8	21.7	57.5	9.1	17.4	18.4	25.1	SCL		6.4
E4121	284-317	BC	0.0	0.0	6.9	62.3	12.4	81.6	2.8	5.5	10.2	12.9	FSL		6.6
E4122	317-360	CB	0.0	0.4	22.0	53.3	7.7	83.4	1.6	3.2	10.9	13.4	LFS		6.4
E4123	360-399	C1	0.0	0.1	9.9	58.1	12.9	81.0	2.7	5.8	10.1	13.2	FSL		6.2
E4124	399-475	C2	0.0	0.1	7.1	71.2	8.4	86.8	1.0	2.7	7.9	10.5	LFS		6.0

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Derly (correlated as Gallime) PEDON NUMBER: S11TX2897019 12/10/2011
SOIL FAMILY: Glossic Paleudalf; fine, mixed, semiactive, thermic
LOCATION: Leona Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAGMENTS %	pH (H2O) 1:1
			%												
E4125	0-20	Ap	0.0	0.6	2.1	17.0	17.2	36.9	24.0	40.1	15.3	23.0	L		4.9
E4126	20-46	E/Bt	0.0	0.1	1.3	16.1	17.2	34.7	24.7	39.7	17.8	25.6	L		4.5
E4127	46-72	Bt1	0.0	0.0	1.0	13.2	15.0	29.2	22.8	35.6	26.8	35.2	CL		4.5
E4128	72-113	Bt2	0.0	0.1	1.0	13.7	15.2	30.0	22.0	34.6	27.1	35.4	CL		4.7
E4129	113-136	Bt3	0.0	0.0	1.3	16.6	15.7	33.6	19.2	31.0	26.1	35.4	CL		5.9
E4130	136-170	Bt4	0.0	0.1	0.9	16.0	17.7	34.7	18.0	31.9	23.2	33.4	CL		7.1
E4131	170-206	Bt5	0.0	0.1	1.2	21.3	18.6	41.2	14.8	26.2	22.7	32.6	CL		7.4
E4132	206-251	Btg1	0.0	0.0	1.0	34.0	16.0	51.0	12.2	20.5	19.8	28.5	SCL		7.5
E4133	251-270	Btg2	0.0	0.1	2.0	43.8	23.0	68.9	8.0	16.3	10.2	14.8	FSL		7.4
E4134	270-298	BC	0.0	0.2	4.3	70.6	9.5	84.6	2.3	3.5	8.2	11.9	LFS		7.3
E4135	298-321	CB	0.0	0.1	5.8	71.9	7.2	85.0	1.6	1.9	9.8	13.1	LFS		7.3
E4136	321-352	C1	0.0	0.3	15.4	69.9	6.8	92.4	0.6	0.6	5.5	7.0	FS		7.2
E4137	352-406	C2	0.4	1.1	20.3	62.6	4.5	88.9	2.2	2.9	5.7	8.2	LFS		7.2
E4138	406-443	C3	0.0	0.0	0.5	6.3	8.2	15.0	26.3	41.7	27.4	43.3	SiC		7.3
E4139	443-460	C4	0.0	0.1	1.8	43.0	24.0	68.9	6.9	12.6	11.4	18.5	FSL		7.3

SOIL SERIES: Rader taxadjunct PEDON NUMBER: S11TX2897021 12/10/2011
SOIL FAMILY: Chromic Vertic Hapludalf; fine, smectitic, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAGMENTS %	pH (H2O) 1:1
			%												
E4140	0-12	Ap	0.1	0.2	4.4	46.1	22.9	73.7	8.7	21.5	2.1	4.8	FSL		5.4
E4141	12-32	E1	0.0	0.1	4.6	47.9	21.6	74.2	8.5	20.8	2.2	5.0	FSL		5.7
E4142	32-50	E2	0.2	0.2	4.0	47.3	21.7	73.4	9.3	21.2	2.5	5.4	FSL		6.0
E4143	50-61	Bt	0.2	0.3	3.4	38.9	17.9	60.7	9.4	19.8	13.2	19.5	FSL		6.1
E4144	61-81	Btss1	0.0	0.1	2.2	25.6	10.7	38.6	8.9	14.9	37.3	46.5	C		5.5
E4145	81-103	Btss2	0.0	0.0	3.4	32.3	8.7	44.4	8.5	14.3	33.2	41.3	C		5.0
E4146	103-135	B't1	0.1	0.1	4.0	40.2	9.6	54.0	7.2	14.0	24.4	32.0	SCL		5.2
E4147	135-160	B't2	0.0	0.1	4.5	50.2	11.0	65.8	5.2	11.1	17.2	23.1	SCL		5.2
E4148	160-191	B't3	0.0	0.0	4.0	58.5	12.8	75.3	3.9	8.8	11.9	15.9	FSL		5.2
E4149	191-227	C1	0.0	0.0	4.7	70.1	14.7	89.5	2.4	5.9	3.1	4.6	FS		5.5
E4150	227-256	C2	0.0	0.0	5.3	73.4	5.9	84.6	1.0	1.9	11.0	13.5	LFS		5.3
E4151	256-290	Cg1	0.0	0.0	4.0	26.5	24.6	55.1	9.1	22.5	15.2	22.4	SCL		5.7
E4152	290-317	Cg2	0.0	0.1	8.2	40.2	19.7	68.2	6.1	17.6	9.7	14.2	FSL		6.1

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Rader taxadjunct — PEDON NUMBER: S11TX2897023 — 12/10/2011
SOIL FAMILY: Chromic Vertic Hapludalf; fine-loamy, siliceous, active, thermic
LOCATION: Middleton Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4153	0-15	Ap	0.0	0.3	5.2	46.8	20.1	72.4	9.3	21.2	3.1	6.4	FSL	1	6.0
E4154	15-32	A	0.0	0.1	4.8	48.7	20.8	74.4	8.5	19.7	2.7	5.9	FSL		6.5
E4155	32-49	E1	0.0	0.1	4.8	48.0	20.4	73.3	8.9	20.9	2.5	5.8	FSL		6.4
E4156	49-62	E2	0.0	0.1	4.5	47.0	20.2	71.8	9.8	21.8	2.7	6.4	FSL		6.4
E4157	62-75	Bt	0.0	0.2	4.6	41.4	16.1	62.3	9.8	19.8	11.1	17.9	FSL		6.2
E4158	75-96	Btss	0.0	0.0	3.5	27.8	8.6	39.9	9.0	15.7	33.9	44.4	C		4.8
E4159	96-126	Btv1	0.1	0.2	4.9	38.0	8.5	51.7	8.4	13.1	27.4	35.2	SC		4.5
E4160	126-150	Btv2	0.3	0.5	7.5	46.1	7.2	61.6	5.8	10.7	20.7	27.7	SCL	1	4.4
E4161	150-190	B't	0.0	0.1	8.2	58.4	7.1	73.8	3.7	6.6	14.1	19.6	FSL		4.4
E4162	190-215	BCt	0.0	0.0	6.3	67.9	8.1	82.3	1.6	3.6	11.1	14.1	FSL		4.7
E4163	215-247	Cg	0.0	0.0	2.9	71.1	16.6	90.6	1.8	4.8	3.2	4.6	FS		5.8
E4164	247-289	C1	0.0	0.0	6.1	78.8	8.4	93.3	0.9	1.4	3.6	5.3	FS		5.4
E4165	289-322	C2	0.0	0.0	3.1	63.1	14.5	80.7	2.2	5.4	10.5	13.9	FSL		5.6

SOIL SERIES: Derly (correlated as Rodessa) — PEDON NUMBER: S11TX2897025 — 12/21/2011
SOIL FAMILY: Aquic Glossudalf; fine, mixed, active, thermic
LOCATION: Lake Leon Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4166	0-9	Ap	0.2	0.2	1.0	21.2	32.4	55.0	18.2	38.4	2.7	6.6	VFSL		5.4
E4167	9-38	E	0.0	0.1	0.6	21.6	32.8	55.1	19.2	35.2	4.0	9.7	VFSL		4.8
E4168	38-59	E/Bt	0.6	0.3	1.0	22.2	32.5	56.6	14.1	28.3	8.2	15.1	VFSL	1	4.7
E4169	59-93	Btg1	0.0	0.0	0.3	11.5	21.0	32.8	7.7	16.3	40.6	50.9	C		4.7
E4170	93-147	Btg2	0.0	0.0	0.2	10.7	25.4	36.3	8.1	19.3	36.7	44.4	C		4.8
E4171	147-194	Btg3	0.0	0.0	0.2	10.4	24.9	35.5	14.2	28.4	25.2	36.1	CL		4.9
E4172	194-231	Bt1	0.0	0.0	0.1	5.2	22.4	27.7	19.4	36.3	22.9	36.0	CL		4.8
E4173	231-293	Bt2	0.0	0.0	0.2	17.0	31.4	48.6	9.8	21.0	20.6	30.4	SCL		5.0
E4174	293-336	B'tg	0.0	0.0	0.0	3.0	18.4	21.4	20.8	38.3	24.8	40.3	C		4.8
E4175	336-413	BC	0.0	0.0	0.0	1.4	13.0	14.4	23.7	50.5	21.3	35.1	SiCL		4.5
E4176	413-439	C1	0.0	0.0	0.0	0.4	5.0	5.4	25.9	38.3	33.6	56.3	C		4.4
E4177	439-515	C2	0.0	0.0	0.0	0.5	2.4	2.9	26.7	36.1	36.8	61.0	C		4.4
E4178	515-535	C3	0.0	0.0	0.1	4.0	50.3	54.4	7.2	28.2	11.1	17.4	VFSL		5.0

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Rader (correlated as Gallime) PEDON NUMBER: S11TX2897026 12/21/2011
SOIL FAMILY: Glossic Paleudalf; coarse-loamy, siliceous, active, thermic
LOCATION: Lake Leon Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
			VC	C	M	F	VF	TOTAL	FINE	TOTAL	FINE	TOTAL		COARSE	pH
LAB			(2.0-	(1.0-	(0.5-	(0.25-	(0.10-	(2.0-	(0.02-	(0.05-			TEXTURE	FRAG-	(H2O)
NO	DEPTH	HORIZON	1.0)	0.5)	0.25)	0.10)	0.05)	0.05)	0.002)	0.002)	(<0.0002)	(<0.002)	CLASS	MENTS	1:1
	(cm)		%											%	
E4179	0-15	Ap	0.1	4.1	1.1	26.2	39.1	70.6	11.8	25.0	1.8	4.4	VFSL	1	6.1
E4180	15-39	E	0.0	1.0	1.0	26.5	38.6	67.1	11.8	27.0	2.7	5.9	VFSL	1	5.8
E4181	39-70	E/Bt	0.1	0.0	0.7	25.2	38.2	64.2	11.6	28.1	4.3	7.7	VFSL	1	4.8
E4182	70-123	Bt/E	0.2	0.1	0.7	22.5	35.0	58.5	11.1	26.1	9.7	15.4	VFSL	1	4.7
E4183	123-167	Bt	0.1	0.0	0.6	14.8	24.3	39.8	9.2	19.4	33.0	40.8	C		4.7
E4184	167-197	Btg1	0.0	0.0	0.4	16.0	27.2	43.6	8.3	18.9	29.7	37.5	CL		4.9
E4185	197-244	Btg2	0.0	0.0	0.4	16.8	28.8	46.0	8.4	19.4	26.8	34.6	SCL		5.1
E4186	244-310	Btg3	0.0	0.0	0.4	18.6	30.4	49.4	9.8	22.2	20.2	28.4	SCL		5.1
E4187	310-344	BCt	0.0	0.0	0.0	0.8	2.4	3.2	30.2	38.3	35.0	58.5	C		4.8
E4188	344-398	CBt	0.0	0.0	0.0	1.5	12.4	13.9	23.5	52.4	21.2	33.7	SiCL		4.8
E4189	398-435	CBtg	0.0	0.0	0.0	0.2	5.6	5.8	30.8	53.1	24.3	41.1	SiC		4.7
E4190	435-508	C1	0.0	0.0	0.0	1.2	3.7	4.9	27.2	38.8	33.9	56.3	C		4.6
E4191	508-540	C2	0.0	0.0	0.1	3.6	18.1	21.8	17.5	44.1	21.5	34.1	CL		4.9
E4192	540-600	C3	0.0	0.0	0.1	8.5	52.6	61.2	6.2	23.1	9.8	15.7	VFSL		6.0

SOIL SERIES: Rader (correlated as Gallime) PEDON NUMBER: S11TX2897027 12/21/2011
SOIL FAMILY: Glossic Paeudalf; coarse-loamy, siliceous, active, thermic
LOCATION: Lake Leon Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
			VC	C	M	F	VF	TOTAL	FINE	TOTAL	FINE	TOTAL		COARSE	pH
LAB			(2.0-	(1.0-	(0.5-	(0.25-	(0.10-	(2.0-	(0.02-	(0.05-			TEXTURE	FRAG-	(H2O)
NO	DEPTH	HORIZON	1.0)	0.5)	0.25)	0.10)	0.05)	0.05)	0.002)	0.002)	(<0.0002)	(<0.002)	CLASS	MENTS	1:1
	(cm)		%											%	
E4193	0-22	A	0.1	0.2	1.2	25.1	38.1	64.7	13.0	30.9	1.8	4.4	VFSL	1	6.0
E4194	22-76	E	0.1	0.1	0.8	25.5	39.2	65.7	11.7	29.5	2.2	4.8	VFSL	1	4.9
E4195	76-98	E/Bt	0.0	0.1	0.7	25.3	37.6	63.7	11.6	28.7	4.0	7.6	VFSL		4.5
E4196	98-160	Bt/E	0.2	0.1	0.7	23.9	35.5	60.4	10.5	27.2	7.4	12.4	VFSL		4.6
E4197	160-208	Bt	0.0	0.0	0.7	16.7	24.2	41.6	9.6	21.4	30.0	37.0	CL		4.6
E4198	208-232	Btg1	0.1	0.0	0.5	14.1	24.6	39.3	9.8	20.5	32.6	40.2	C		4.4
E4199	232-265	Btg2	0.0	0.0	0.4	15.4	25.8	41.6	11.2	23.9	25.9	34.5	CL		4.6
E4200	265-313	Btg3	0.0	0.0	0.3	12.6	25.7	38.6	14.6	28.9	22.7	32.5	CL		4.6
E4201	313-380	Btg4	0.0	0.0	0.1	8.8	30.8	39.7	12.6	28.1	21.5	32.2	CL		4.7
E4202	380-402	BCtg	0.0	0.0	0.0	1.2	7.2	8.4	30.1	43.7	28.5	47.9	SiC		4.7
E4203	402-503	CB	0.0	0.0	0.0	0.9	6.6	7.5	28.2	51.4	25.1	41.1	SiC		4.8
E4204	503-542	C1	0.0	0.0	0.1	3.4	27.0	30.5	15.3	36.4	21.0	33.1	CL		4.8
E4205	542-570	C2	0.0	0.0	0.0	3.7	55.3	59.0	6.5	25.0	10.6	16.0	VFSL		5.1

SOIL CHARACTERIZATION LABORATORY
SOIL AND CROP SCIENCES DEPT., THE TEXAS AGRICULTURAL EXPERIMENT STATION

SOIL SERIES: Rader (correlated as Gallime) PEDON NUMBER: S11TX2897028 12/21/2011
SOIL FAMILY: Glossic Paleudalf; coarse-loamy, siliceous, active, thermic
LOCATION: Lake Leon Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4206	0-15	Ap	0.0	0.2	0.7	24.1	39.7	64.7	13.1	30.7	2.3	4.6	VFSL	1	7.6
E4207	15-36	E	0.0	0.1	0.7	24.9	39.4	65.1	12.9	30.1	2.1	4.8	VFSL	1	7.7
E4208	36-70	E/Bt	0.0	0.0	0.7	23.8	37.4	61.9	12.8	29.6	4.7	8.5	VFSL	1	6.5
E4209	70-123	Bt/E	0.0	0.2	0.8	22.5	33.8	57.3	12.1	26.1	10.5	16.6	VFSL		4.8
E4210	123-190	Bt	0.0	0.1	0.7	14.4	22.5	37.7	9.5	19.8	35.1	42.5	C		4.8
E4211	190-250	Btg1	0.0	0.0	0.5	15.8	27.7	44.0	12.0	23.2	23.3	32.8	CL		4.9
E4212	250-274	Btg2	0.0	0.0	0.2	11.7	22.8	34.7	15.8	26.6	25.2	38.7	CL		4.9
E4213	274-301	B't	0.0	0.0	0.4	25.6	26.7	52.7	9.1	22.9	16.6	24.4	SCL		5.2
E4214	301-339	BCtg	0.0	0.0	0.0	0.9	3.2	4.1	28.4	38.4	34.0	57.5	C		4.7
E4215	339-389	BCt	0.0	0.0	0.1	2.6	9.1	11.8	27.1	48.6	24.0	39.6	SiCL		4.7
E4216	389-430	CB	0.0	0.0	0.0	0.4	7.2	7.6	24.8	40.2	31.7	52.2	SiC		4.7
E4217	430-457	C1	0.0	0.0	0.1	3.6	51.3	55.0	7.2	28.1	10.7	16.9	VFSL		5.1
E4218	457-510	C2	0.0	0.0	0.0	11.3	50.9	62.2	6.7	22.9	9.1	14.9	VFSL		5.2

SOIL SERIES: Derly taxadjunct PEDON NUMBER: S11TX2897029 12/21/2011
SOIL FAMILY: Albaquic Paleudalf; fine-loamy, siliceous, active, thermic
LOCATION: Lake Leon Quad, Leon County, Texas

			PARTICLE SIZE DISTRIBUTION (mm)												
			SAND						SILT		CLAY				
LAB NO	DEPTH (cm)	HORIZON	VC (2.0-1.0)	C (1.0-0.5)	M (0.5-0.25)	F (0.25-0.10)	VF (0.10-0.05)	TOTAL (2.0-0.05)	FINE (0.02-0.002)	TOTAL (0.05-0.002)	FINE (<0.0002)	TOTAL (<0.002)	TEXTURE CLASS	COARSE FRAG-MENTS %	pH (H2O) 1:1
			%												
E4219	0-10	Ap	0.1	0.3	1.0	20.4	31.2	53.0	21.7	40.4	2.3	6.6	VFSL		5.5
E4220	10-36	E	0.1	0.1	0.7	20.4	33.3	54.6	20.5	38.5	2.7	6.9	VFSL	1	5.4
E4221	36-68	Bt1	0.0	0.1	0.7	15.7	23.7	40.2	12.4	24.7	26.6	35.1	CL	1	4.9
E4222	68-128	Bt2	0.0	0.0	0.8	19.4	27.7	47.9	10.4	23.1	22.3	29.0	SCL		5.9
E4223	128-153	Bt3	0.2	0.1	0.2	14.3	32.0	46.8	10.5	23.3	21.7	29.9	SCL		6.6
E4224	153-189	Btg1	0.0	0.0	0.5	16.2	27.2	43.9	12.7	24.6	20.8	31.5	CL		6.4
E4225	189-226	Btg2	0.0	0.0	0.2	11.9	24.7	36.8	16.2	30.2	20.8	33.0	CL		5.9
E4226	226-263	B't	0.0	0.0	0.0	1.3	7.1	8.4	24.5	36.6	32.7	55.0	C		5.1
E4227	263-314	BC	0.0	0.0	0.0	0.5	6.4	6.9	26.6	50.3	25.7	42.8	SiC		5.1
E4228	314-333	CB	0.0	0.0	0.0	0.3	3.4	3.7	26.5	37.4	35.7	58.9	C		5.0
E4229	333-362	C1	0.0	0.0	0.1	4.6	37.8	42.5	10.5	33.3	14.9	24.2	L		5.3
E4230	362-390	C2	0.0	0.0	0.1	4.4	53.4	57.9	6.0	25.7	10.0	16.4	VFSL		5.5

APPENDIX C

SOIL PARTICLE SIZE STATISTICAL

DATA ANALYSES

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
7745	S11TX2890002	Ap	0-12	3.85	69.35	1.75	3.35	0.50	1.16
7746	S11TX2890002	A	12-31	3.84	69.83	1.75	3.32	0.51	1.18
7747	S11TX2890002	AB	31-42	3.82	70.81	1.75	3.34	0.49	1.18
7748	S11TX2890002	Bt/E	42-61	3.99	62.79	1.83	3.45	0.49	1.11
7749	S11TX2890002	Btss	61-83	4.16	55.94	1.90	3.60	0.47	1.02
7750	S11TX2890002	Btssg1	83-102	4.10	58.18	1.87	3.54	0.48	1.05
7751	S11TX2890002	Btssg2	102-133	3.94	65.00	1.80	3.40	0.51	1.11
7752	S11TX2890002	Bt	133-168	3.60	82.47	1.54	3.20	0.51	1.28
7753	S11TX2890002	Btg1	168-188	3.36	97.40	1.33	3.07	0.50	1.46
7754	S11TX2890002	Btg2	188-210	3.11	115.82	1.03	2.95	0.42	1.54
7755	S11TX2890002	Btg3	210-230	3.25	105.11	1.27	3.00	0.46	1.52
7756	S11TX2890002	BC	230-251	3.44	91.93	1.14	3.40	0.20	1.21
7757	S11TX2890002	CB	251-289	3.31	100.83	1.41	3.05	0.43	1.44
7758	S11TX2890002	Cg	289-314	3.06	119.91	0.99	2.93	0.34	1.35
7759	S11TX2890002	C	314-348	2.49	178.01	0.64	2.52	-0.10	0.97
7732	S11TX2890003	Ap	0-16	3.42	93.43	1.38	3.18	0.40	1.27
7733	S11TX2890003	A	16-31	3.41	94.08	1.36	3.17	0.40	1.26
7734	S11TX2890003	E1	31-59	3.43	92.57	1.35	3.20	0.40	1.28
7735	S11TX2890003	E2	59-79	3.47	90.25	1.41	3.21	0.42	1.34
7736	S11TX2890003	Bt1	79-92	3.56	84.79	1.53	3.23	0.46	1.29
7737	S11TX2890003	Bt2	92-114	3.49	89.00	1.59	3.02	0.55	1.36
7738	S11TX2890003	Bt3	114-134	3.30	101.53	1.46	2.92	0.53	1.73
7739	S11TX2890003	Bt4	134-161	3.10	116.90	1.28	2.85	0.48	1.96
7740	S11TX2890003	Bt5	161-187	2.92	132.43	1.04	2.80	0.39	1.89
7741	S11TX2890003	BCtg	187-220	2.76	148.10	0.71	2.73	0.19	1.33
7742	S11TX2890003	C1	220-246	2.80	143.97	0.69	2.76	0.19	1.18
7743	S11TX2890003	C2	246-285	3.02	122.99	0.88	2.92	0.27	1.17
7744	S11TX2890003	C3	285-320	2.88	135.53	0.74	2.82	0.26	1.22
7760	S11TX2890004	Ap	0-13	4.22	53.54	2.00	3.65	0.43	0.96
7761	S11TX2890004	Btg1	13-27	4.27	51.95	2.02	3.66	0.45	0.93
7762	S11TX2890004	Btg2	27-41	4.23	53.41	2.00	3.64	0.44	0.97
7763	S11TX2890004	Btssg1	41-54	4.34	49.49	2.08	3.68	0.45	0.86
7764	S11TX2890004	Btssg2	54-83	4.37	48.36	2.10	3.72	0.44	0.86
7765	S11TX2890004	Btssg3	83-123	4.42	46.61	2.13	3.78	0.42	0.81
7766	S11TX2890004	Btssg4	123-165	4.54	43.03	2.14	3.99	0.37	0.79
7767	S11TX2890004	Btyg1	165-190	4.17	55.68	1.97	3.60	0.45	0.97

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
7768	S11TX2890004	Btyg2	190-205	3.40	94.95	1.43	3.12	0.46	1.52
7769	S11TX2890004	Btyg3	205-233	3.30	101.53	1.35	3.08	0.45	1.57
7770	S11TX2890004	BCtg	233-257	3.20	108.82	1.27	3.04	0.39	1.56
7771	S11TX2890004	CBtg	257-284	2.87	136.79	1.09	2.83	0.16	1.16
7772	S11TX2890004	Cg1	284-308	3.56	84.98	1.31	3.59	0.13	1.44
7773	S11TX2890004	Cg2	308-337	3.79	72.29	1.17	3.78	0.17	1.49
E3836	S11TX2897001	Ap	0-22	3.588	83.19	1.398	3.371	0.409	1.443
E3837	S11TX2897001	E	22-38	3.419	93.51	1.197	3.296	0.347	1.376
E3838	S11TX2897001	E/Bt	38-53	3.409	94.17	1.210	3.276	0.361	1.437
E3839	S11TX2897001	Btg1	53-77	3.474	90.00	1.409	3.232	0.457	1.575
E3840	S11TX2897001	Btg2	77-103	3.328	99.57	1.305	3.144	0.449	1.674
E3841	S11TX2897001	Btg3	103-132	3.650	79.66	1.594	3.170	0.568	1.578
E3842	S11TX2897001	Btkg	132-152	3.523	86.97	1.493	3.150	0.538	1.616
E3843	S11TX2897001	Btk1	152-171	3.890	67.45	1.761	3.270	0.574	1.394
E3844	S11TX2897001	Btk2	171-184	3.252	105.00	1.280	3.038	0.490	1.783
E3845	S11TX2897001	BCtg	184-206	3.197	109.07	0.971	3.120	0.303	1.301
E3846	S11TX2897001	CBg	206-222	3.387	95.61	1.050	3.400	0.190	1.364
E3847	S11TX2897001	Cg	222-267	3.177	110.59	0.696	3.150	0.071	0.816
E3848	S11TX2897002	Ap	0-21	3.534	86.31	1.330	3.373	0.369	1.482
E3849	S11TX2897002	A	21-32	3.448	91.65	1.224	3.343	0.333	1.484
E3850	S11TX2897002	E1	32-45	3.400	94.74	1.177	3.320	0.308	1.473
E3851	S11TX2897002	E2	45-55	3.379	96.10	1.138	3.298	0.309	1.411
E3852	S11TX2897002	E3	55-67	3.386	95.66	1.132	3.308	0.296	1.382
E3853	S11TX2897002	E4	67-85	3.372	96.62	1.179	3.285	0.321	1.428
E3854	S11TX2897002	Bt	85-110	3.418	93.55	1.184	3.314	0.329	1.433
E3855	S11TX2897002	Btg1	110-135	3.316	100.38	1.167	3.229	0.342	1.566
E3856	S11TX2897002	Btg2	135-159	3.364	97.11	1.288	3.213	0.407	1.617
E3857	S11TX2897002	B't1	159-195	3.409	94.13	1.372	3.171	0.470	1.660
E3858	S11TX2897002	B't2	195-221	3.218	107.49	1.139	3.103	0.386	1.568
E3859	S11TX2897002	BCt	221-251	3.363	97.17	0.744	3.440	-0.102	0.876
E3860	S11TX2897002	Cg	251-261	3.333	99.21	0.724	3.380	-0.066	0.838
E3861	S11TX2897003	Ap	0-16	3.869	68.45	1.664	3.446	0.478	1.458
E3862	S11TX2897003	A	16-29	3.656	79.31	1.465	3.409	0.420	1.528
E3863	S11TX2897003	E	29-44	3.418	93.55	1.164	3.324	0.311	1.365
E3864	S11TX2897003	Bt1	44-63	3.414	93.81	1.188	3.312	0.326	1.414
E3865	S11TX2897003	Bt2	63-96	3.440	92.14	1.278	3.340	0.341	1.560

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E3866	S11TX2897003	Bt3	96-125	3.571	84.14	1.404	3.400	0.387	1.630
E3867	S11TX2897003	Btk	125-144	3.390	95.37	1.338	3.221	0.427	1.655
E3868	S11TX2897003	Btkg	144-175	3.467	90.43	1.382	3.221	0.465	1.639
E3869	S11TX2897003	Btg1	175-198	3.628	80.88	1.506	3.362	0.446	1.560
E3870	S11TX2897003	Btg2	198-220	3.423	93.21	1.190	3.430	0.231	1.590
E3871	S11TX2897003	Btg3	220-238	3.547	85.58	1.061	3.610	0.123	1.555
E3872	S11TX2897003	BCtg	238-251	3.700	76.95	1.066	3.730	0.137	1.663
E3873	S11TX2897003	Cg	251-275	3.203	108.57	0.700	3.200	0.022	0.805
E3874	S11TX2897004	A	0-5	4.200	54.41	1.837	3.800	0.380	1.063
E3875	S11TX2897004	Ap	5-23	4.055	60.17	1.773	3.564	0.477	1.299
E3876	S11TX2897004	BAg	23-39	4.227	53.40	1.852	3.681	0.467	1.134
E3877	S11TX2897004	Btg1	39-60	4.151	56.30	1.812	3.612	0.482	1.244
E3878	S11TX2897004	Btg2	60-74	4.054	60.21	1.755	3.531	0.495	1.319
E3879	S11TX2897004	Btg3	74-98	4.142	56.65	1.843	3.555	0.507	1.249
E3880	S11TX2897004	Btg4	98-125	3.983	63.23	1.734	3.469	0.506	1.383
E3881	S11TX2897004	Btg5	125-146	3.890	67.45	1.631	3.520	0.452	1.587
E3882	S11TX2897004	Btg6	146-173	4.373	48.28	1.902	3.788	0.465	1.055
E3883	S11TX2897004	Btg7	173-194	3.817	70.97	1.461	3.650	0.343	1.550
E3884	S11TX2897004	Btg8	194-218	3.590	83.04	1.128	3.650	0.147	1.823
E3885	S11TX2897004	BCg	218-262	3.324	99.86	0.925	3.354	0.141	1.216
E3886	S11TX2897004	Cg	262-296	3.153	112.40	0.708	3.120	0.092	0.835
E3914	S11TX2897005	Ap	0-18	4.293	51.00	1.943	3.680	0.479	0.955
E3915	S11TX2897005	A	18-39	4.043	60.67	1.822	3.420	0.542	1.280
E3916	S11TX2897005	E	39-51	3.986	63.12	1.781	3.400	0.535	1.360
E3917	S11TX2897005	Btg	51-69	4.062	59.86	1.847	3.450	0.522	1.124
E3918	S11TX2897005	Btss	69-99	4.350	49.04	1.979	3.700	0.481	0.892
E3919	S11TX2897005	Bt	99-125	4.463	45.33	1.973	3.970	0.387	0.839
E3920	S11TX2897005	Btk	125-143	4.357	48.81	1.963	3.750	0.460	0.893
E3921	S11TX2897005	Btkg1	143-183	4.437	46.15	1.966	3.892	0.421	0.896
E3922	S11TX2897005	Btkg2	183-212	4.630	40.39	2.044	4.200	0.323	0.800
E3923	S11TX2897005	Btkg3	212-230	4.477	44.90	1.972	3.912	0.426	0.895
E3924	S11TX2897005	CBg1	230-244	5.137	28.43	2.109	4.820	0.202	0.756
E3925	S11TX2897005	CBg2	244-259	4.097	58.45	1.838	3.520	0.507	1.177
E3926	S11TX2897005	Cg	259-275	2.748	148.85	0.547	2.750	0.129	1.103
E3927	S11TX2897006	Ap	0-17	4.004	62.31	1.810	3.408	0.534	1.393
E3928	S11TX2897006	A	17-39	3.975	63.59	1.795	3.395	0.529	1.453

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E3929	S11TX2897006	E	39-55	3.970	63.80	1.776	3.380	0.546	1.398
E3930	S11TX2897006	Bt1	55-74	3.939	65.20	1.773	3.346	0.543	1.555
E3931	S11TX2897006	Bt2	74-111	4.217	53.78	1.946	3.550	0.517	0.940
E3932	S11TX2897006	Btk1	111-141	3.940	65.15	1.793	3.300	0.578	1.168
E3933	S11TX2897006	Btk2	141-152	3.910	66.52	1.793	3.250	0.591	1.155
E3934	S11TX2897006	Btk3	152-180	3.937	65.27	1.836	3.250	0.591	1.074
E3935	S11TX2897006	BCtk	180-195	3.880	67.92	1.813	3.200	0.597	1.080
E3936	S11TX2897006	BCtg	195-219	3.949	64.74	1.770	3.370	0.542	1.266
E3937	S11TX2897006	CBtg	219-242	3.773	73.13	1.567	3.450	0.451	1.603
E3938	S11TX2897006	Cg	242-252	2.940	130.32	0.702	2.870	0.282	1.223
E3939	S11TX2897006	C	252-285	2.774	146.22	0.507	2.750	0.165	1.025
E3940	S11TX2897007	Ap	0-21	3.911	66.50	1.758	3.320	0.554	1.480
E3941	S11TX2897007	A	21-31	3.882	67.84	1.712	3.362	0.531	1.475
E3942	S11TX2897007	Bt/E	31-48	3.854	69.16	1.721	3.300	0.552	1.453
E3943	S11TX2897007	Bt1	48-66	4.023	61.51	1.834	3.400	0.540	1.084
E3944	S11TX2897007	Bt2	66-87	4.180	55.17	1.892	3.570	0.504	0.992
E3945	S11TX2897007	Btss	87-120	4.223	53.54	1.929	3.580	0.510	0.943
E3946	S11TX2897007	Btssg	120-143	4.093	58.59	1.879	3.420	0.552	1.004
E3947	S11TX2897007	B't	143-165	4.179	55.21	1.887	3.550	0.516	0.984
E3948	S11TX2897007	Btg	165-186	4.133	56.98	1.889	3.500	0.520	1.017
E3949	S11TX2897007	BCkg	186-205	4.207	54.16	1.937	3.570	0.503	0.962
E3950	S11TX2897007	CBkg	205-239	4.154	56.17	1.833	3.642	0.463	1.071
E3951	S11TX2897007	Cg1	239-262	3.723	75.75	1.559	3.378	0.467	1.544
E3952	S11TX2897007	Cg2	262-280	3.330	99.46	1.285	3.299	0.298	1.739
E3953	S11TX2897008	Ap	0-19	4.573	42.00	2.059	4.100	0.347	0.817
E3954	S11TX2897008	A	19-39	4.790	36.15	2.067	4.500	0.234	0.802
E3955	S11TX2897008	Btg1	39-58	4.455	45.59	1.993	3.896	0.421	0.869
E3956	S11TX2897008	Btg2	58-78	4.243	52.80	1.956	3.570	0.514	0.923
E3957	S11TX2897008	Btg3	78-102	4.240	52.92	1.941	3.600	0.500	0.930
E3958	S11TX2897008	Btkg	102-132	4.170	55.55	1.897	3.550	0.508	0.987
E3959	S11TX2897008	B'tg1	132-157	4.657	39.65	2.032	4.270	0.303	0.818
E3960	S11TX2897008	B'tg2	157-175	4.750	37.16	1.954	4.200	0.393	0.908
E3961	S11TX2897008	B'tg3	175-191	4.006	62.22	1.749	3.469	0.517	1.527
E3962	S11TX2897008	Cg	191-230	2.868	136.94	0.607	2.820	0.179	1.035
E3963	S11TX2897009	Ap	0-16	4.323	49.95	1.982	3.670	0.486	0.900
E3964	S11TX2897009	A	16-36	4.307	50.53	1.954	3.700	0.470	0.926

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E3965	S11TX2897009	AB	36-55	4.327	49.84	1.962	3.730	0.465	0.943
E3966	S11TX2897009	Bt	55-76	4.273	51.71	1.924	3.650	0.493	0.972
E3967	S11TX2897009	Btg1	76-100	4.137	56.85	1.882	3.500	0.524	1.038
E3968	S11TX2897009	Btg2	100-118	4.115	57.73	1.866	3.470	0.536	1.060
E3969	S11TX2897009	Btg3	118-141	4.150	56.33	1.921	3.450	0.552	0.997
E3970	S11TX2897009	BCtg	141-173	3.974	63.66	1.808	3.350	0.559	1.219
E3971	S11TX2897009	CBg	173-201	3.759	73.88	1.628	3.306	0.523	1.614
E3972	S11TX2897009	Cg1	201-226	3.023	122.99	0.920	2.920	0.390	1.588
E3973	S11TX2897009	Cg2	226-239	3.193	109.32	1.043	3.150	0.311	1.556
E3984	S11TX2897010	Ap	0-14	4.483	44.71	1.857	4.100	0.332	1.121
E3985	S11TX2897010	Bt/E	14-32	4.467	45.20	1.857	4.052	0.358	1.136
E3986	S11TX2897010	Bt1	32-59	4.602	41.18	1.881	4.155	0.358	1.080
E3987	S11TX2897010	Bt2	59-96	4.595	41.37	1.879	4.136	0.367	1.078
E3988	S11TX2897010	Bt3	96-133	3.754	74.13	1.391	3.680	0.246	1.484
E3989	S11TX2897010	Bt4	133-162	4.161	55.89	1.267	3.934	0.383	1.839
E3990	S11TX2897010	Bt5	162-190	4.457	45.54	1.337	4.100	0.499	1.535
E3991	S11TX2897010	Bt6	190-213	4.213	53.91	1.235	3.970	0.426	1.826
E3992	S11TX2897010	BC	213-236	3.983	63.23	0.843	3.900	0.314	1.913
E3993	S11TX2897010	C1	236-263	4.657	39.65	1.383	4.230	0.540	1.340
E3994	S11TX2897010	C2	263-316	3.997	62.65	1.011	3.900	0.346	2.244
E3995	S11TX2897010	C3	316-336	2.737	150.03	0.442	2.730	0.061	0.883
E3996	S11TX2897011	Ap	0-18	3.940	65.14	1.408	3.841	0.252	1.552
E3997	S11TX2897011	E	18-39	3.950	64.70	1.403	3.830	0.271	1.554
E3998	S11TX2897011	Bt/E	39-46	4.167	55.68	1.581	3.900	0.346	1.494
E3999	S11TX2897011	Bt1	46-61	4.423	46.61	1.716	4.020	0.387	1.264
E4000	S11TX2897011	Bt2	61-91	4.420	46.71	1.586	4.070	0.389	1.399
E4001	S11TX2897011	Btk1	91-132	3.737	75.02	1.470	3.520	0.377	1.417
E4002	S11TX2897011	Btk2	132-163	3.497	88.59	1.196	3.430	0.271	1.375
E4003	S11TX2897011	B't1	163-197	3.989	63.00	0.874	3.900	0.339	2.011
E4004	S11TX2897011	B't2	197-208	4.797	35.98	1.467	4.270	0.578	1.210
E4005	S11TX2897011	BCt	208-222	4.108	58.01	0.920	3.953	0.470	1.952
E4006	S11TX2897011	CBt	222-244	4.517	43.69	1.259	4.100	0.615	1.571
E4007	S11TX2897011	C1	244-266	3.856	69.08	0.713	3.850	0.135	1.805
E4008	S11TX2897011	C2	266-312	3.873	68.27	0.786	3.850	0.193	2.031
E4009	S11TX2897011	C3	312-330	3.407	94.30	0.818	3.470	-0.019	0.994
E4010	S11TX2897012	Ap	0-19	3.926	65.78	1.363	3.819	0.262	1.570

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E4011	S11TX2897012	E1	19-42	3.890	67.44	1.315	3.801	0.250	1.529
E4012	S11TX2897012	E2	42-67	3.880	67.91	1.310	3.791	0.252	1.601
E4013	S11TX2897012	E3	67-94	3.893	67.30	1.304	3.810	0.246	1.598
E4014	S11TX2897012	E/Bt	94-113	3.863	68.71	1.311	3.790	0.239	1.607
E4015	S11TX2897012	Bt1	113-150	4.183	55.05	1.439	3.950	0.348	1.667
E4016	S11TX2897012	Bt2	150-190	4.025	61.43	1.388	3.865	0.313	1.630
E4017	S11TX2897012	Bt3	190-212	3.767	73.47	1.219	3.750	0.206	1.721
E4018	S11TX2897012	Bt4	212-240	4.020	61.64	1.150	3.880	0.342	2.007
E4019	S11TX2897012	BCt	240-264	3.830	70.32	0.786	3.820	0.181	2.092
E4020	S11TX2897012	CBt	264-295	3.873	68.24	1.165	3.820	0.239	1.915
E4021	S11TX2897012	C1	295-319	3.407	94.30	0.882	3.470	0.033	1.114
E4022	S11TX2897012	C2	319-340	3.407	94.30	0.875	3.470	0.026	1.096
E4023	S11TX2897013	Ap	0-20	3.955	64.47	1.416	3.816	0.290	1.585
E4024	S11TX2897013	E1	20-39	3.915	66.28	1.391	3.796	0.284	1.671
E4025	S11TX2897013	E2	39-66	3.980	63.37	1.459	3.820	0.305	1.661
E4026	S11TX2897013	Bt/E	66-101	4.230	53.29	1.616	3.900	0.384	1.557
E4027	S11TX2897013	Bt	101-128	4.320	50.07	1.646	3.960	0.385	1.473
E4028	S11TX2897013	Btss	128-159	4.423	46.61	1.662	3.950	0.452	1.447
E4029	S11TX2897013	Btk1	159-189	4.590	41.52	1.741	4.020	0.477	1.251
E4030	S11TX2897013	Btk2	189-218	3.800	71.79	1.205	3.770	0.247	2.147
E4031	S11TX2897013	B't	218-242	4.000	62.50	1.185	3.870	0.321	1.967
E4032	S11TX2897013	BCtk	242-263	3.520	87.17	1.110	3.540	0.180	1.512
E4033	S11TX2897013	CB	263-305	3.570	84.20	0.659	3.670	-0.213	1.103
E4034	S11TX2897013	C1	305-365	3.503	88.18	0.741	3.620	-0.169	1.079
E4035	S11TX2897013	C2	365-375	3.147	112.92	0.718	3.100	0.120	0.838
E4036	S11TX2897014	Ap	0-18	4.840	34.92	1.994	4.270	0.381	0.884
E4037	S11TX2897014	Bt	18-32	4.923	32.96	1.984	4.320	0.392	0.859
E4038	S11TX2897014	Btg1	32-53	4.793	36.06	1.970	4.180	0.418	0.885
E4039	S11TX2897014	Btg2	53-82	4.793	36.06	1.970	4.180	0.418	0.882
E4040	S11TX2897014	Btg3	82-98	4.797	35.98	1.957	4.150	0.441	0.875
E4041	S11TX2897014	Btk1	98-119	4.747	37.25	1.930	4.110	0.451	0.928
E4042	S11TX2897014	Btk2	119-148	4.693	38.65	1.894	4.050	0.466	0.975
E4043	S11TX2897014	Btk3	148-180	4.170	55.55	1.664	3.800	0.408	1.484
E4044	S11TX2897014	Btkg	180-206	4.137	56.85	1.563	3.880	0.355	1.429
E4045	S11TX2897014	B'tg	206-244	3.927	65.75	1.409	3.780	0.307	1.646
E4046	S11TX2897014	Cg	244-275	3.253	104.87	0.868	3.230	0.180	1.094

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E4047	S11TX2897014	Ck	275-310	3.023	122.99	0.799	2.920	0.329	1.256
E4048	S11TX2897015	Ap	0-19	4.37	48.26	1.89	3.97	0.36	1.05
E4049	S11TX2897015	Bt/E	19-35	4.55	42.78	1.98	4.04	0.37	0.94
E4050	S11TX2897015	Bt1	35-59	4.35	48.91	1.89	3.91	0.38	1.05
E4051	S11TX2897015	Bt2	59-91	4.41	47.01	1.91	3.94	0.38	1.01
E4052	S11TX2897015	Bt3	91-113	4.34	49.46	1.89	3.86	0.41	1.06
E4053	S11TX2897015	Bt4	113-140	4.45	45.64	1.94	3.93	0.41	0.97
E4054	S11TX2897015	Btg	140-178	4.23	53.29	1.79	3.79	0.41	1.17
E4055	S11TX2897015	Btv	178-220	3.72	76.03	1.42	3.60	0.30	1.44
E4056	S11TX2897015	BCtg	220-260	3.79	72.13	1.29	3.75	0.22	1.54
E4057	S11TX2897015	CB	260-280	3.65	79.93	1.35	3.55	0.30	1.48
E4078	S11TX2897016	Ap	0-15	3.86	68.66	1.47	3.74	0.27	1.29
E4079	S11TX2897016	E1	15-38	3.87	68.28	1.48	3.73	0.29	1.29
E4080	S11TX2897016	E2	38-68	3.95	64.90	1.52	3.80	0.29	1.33
E4081	S11TX2897016	Bt/E	68-101	4.17	55.68	1.69	3.85	0.36	1.22
E4082	S11TX2897016	Bt1	101-118	4.15	56.20	1.82	3.76	0.38	1.16
E4083	S11TX2897016	Bt2	118-149	4.37	48.47	1.85	3.97	0.36	1.09
E4084	S11TX2897016	Bt3	149-169	4.36	48.56	1.84	3.92	0.39	1.08
E4085	S11TX2897016	Bt4	169-189	4.24	53.05	1.77	3.83	0.40	1.15
E4086	S11TX2897016	Bt5	189-208	4.05	60.37	1.65	3.75	0.38	1.31
E4087	S11TX2897016	Btv1	208-243	3.50	88.39	1.31	3.30	0.39	1.35
E4088	S11TX2897016	Btv2	243-263	3.46	91.07	1.28	3.31	0.36	1.38
E4089	S11TX2897016	B't	263-285	3.40	94.51	1.21	3.23	0.38	1.35
E4090	S11TX2897016	BC	285-320	2.68	155.90	0.61	2.70	0.02	1.09
E4091	S11TX2897016	CB	320-363	2.89	135.15	0.90	2.80	0.30	1.46
E4092	S11TX2897016	C1	363-399	2.81	142.75	0.60	2.77	0.18	1.04
E4093	S11TX2897016	C2	399-432	2.65	159.07	0.55	2.66	-0.01	0.97
E4094	S11TX2897017	Ap	0-18	3.83	70.15	1.45	3.73	0.26	1.34
E4095	S11TX2897017	E1	18-45	3.84	69.67	1.38	3.75	0.26	1.32
E4096	S11TX2897017	E2	45-77	3.78	72.96	1.40	3.70	0.25	1.32
E4097	S11TX2897017	E/Bt	77-111	3.86	68.75	1.47	3.73	0.28	1.33
E4098	S11TX2897017	Bt/E	111-143	4.01	61.93	1.62	3.77	0.34	1.26
E4099	S11TX2897017	Bt1	143-160	4.00	62.50	1.74	3.65	0.39	1.24
E4100	S11TX2897017	Bt2	160-183	4.21	53.91	1.87	3.74	0.42	1.11
E4101	S11TX2897017	Bt3	183-217	4.24	53.03	1.82	3.78	0.42	1.14
E4102	S11TX2897017	Bt4	217-238	4.07	59.42	1.72	3.67	0.43	1.28

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_1)	Median (φ)	Skewness	Kurtosis
E4103	S11TX2897017	Btv1	238-258	3.90	66.99	1.59	3.62	0.39	1.42
E4104	S11TX2897017	Btv2	258-284	3.59	82.89	1.32	3.50	0.31	1.53
E4105	S11TX2897017	BCt1	284-313	3.32	100.47	1.16	3.20	0.36	1.51
E4106	S11TX2897017	BCt2	313-353	2.97	127.92	0.84	2.87	0.35	1.44
E4107	S11TX2897017	C1	353-393	2.77	146.94	0.68	2.75	0.18	1.23
E4108	S11TX2897017	C2	393-432	2.52	174.34	0.83	2.55	0.05	1.19
E4109	S11TX2897017	Cg	432-500	2.51	175.96	1.05	2.50	0.16	1.22
E4110	S11TX2897018	Ap	0-17	3.79	72.13	1.45	3.68	0.26	1.28
E4111	S11TX2897018	E1	17-38	3.84	69.99	1.42	3.73	0.26	1.33
E4112	S11TX2897018	E2	38-59	3.80	71.79	1.41	3.70	0.26	1.30
E4113	S11TX2897018	E/Bt	59-78	3.88	68.08	1.41	3.77	0.26	1.33
E4114	S11TX2897018	Bt/E	78-103	3.82	70.97	1.47	3.70	0.27	1.34
E4115	S11TX2897018	Btg	103-133	3.97	63.67	1.63	3.75	0.33	1.25
E4116	S11TX2897018	Bt1	133-149	3.91	66.52	1.73	3.61	0.35	1.21
E4117	S11TX2897018	Bt2	149-183	4.08	59.08	1.75	3.69	0.40	1.19
E4118	S11TX2897018	Bt3	183-208	4.22	53.80	1.84	3.77	0.41	1.09
E4119	S11TX2897018	Bt4	208-244	4.28	51.62	1.85	3.81	0.41	1.07
E4120	S11TX2897018	B'tg	244-284	3.61	81.90	1.44	3.40	0.40	1.47
E4121	S11TX2897018	BC	284-317	2.81	142.60	0.73	2.77	0.22	1.29
E4122	S11TX2897018	CB	317-360	2.48	178.81	0.77	2.52	0.00	1.05
E4123	S11TX2897018	C1	360-399	2.80	143.59	0.80	2.75	0.20	1.30
E4124	S11TX2897018	C2	399-475	2.70	153.89	0.56	2.69	0.10	1.01
E4125	S11TX2897019	Ap	0-20	4.81	35.57	2.05	4.43	0.26	0.88
E4126	S11TX2897019	E/Bt	20-46	4.90	33.42	2.03	4.50	0.28	0.85
E4127	S11TX2897019	Bt1	46-72	5.02	30.89	2.05	4.60	0.27	0.82
E4128	S11TX2897019	Bt2	72-113	4.94	32.58	2.04	4.52	0.28	0.83
E4129	S11TX2897019	Bt3	113-136	4.72	38.06	2.03	4.20	0.36	0.87
E4130	S11TX2897019	Bt4	136-170	4.66	39.55	1.93	4.21	0.35	0.98
E4131	S11TX2897019	Bt5	170-206	4.33	49.66	1.86	3.88	0.40	1.07
E4132	S11TX2897019	Btg1	206-251	3.87	68.24	1.72	3.35	0.53	1.25
E4133	S11TX2897019	Btg2	251-270	3.39	95.39	1.28	3.23	0.39	1.45
E4134	S11TX2897019	BC	270-298	2.75	148.65	0.58	2.73	0.17	1.12
E4135	S11TX2897019	CB	298-321	2.70	153.89	0.50	2.70	0.04	0.93
E4136	S11TX2897019	C1	321-352	2.56	169.18	0.59	2.57	-0.07	1.01
E4137	S11TX2897019	C2	352-406	2.47	180.91	0.67	2.50	-0.10	1.00
E4138	S11TX2897019	C3	406-443	5.63	20.24	1.95	5.43	0.10	0.85

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E4139	S11TX2897019	C4	443-460	3.29	102.00	1.20	3.20	0.35	1.54
E4140	S11TX2897021	Ap	0-12	3.44	91.93	1.34	3.23	0.38	1.25
E4141	S11TX2897021	E1	12-32	3.43	93.00	1.33	3.18	0.41	1.28
E4142	S11TX2897021	E2	32-50	3.44	91.93	1.38	3.18	0.43	1.33
E4143	S11TX2897021	Bt	50-61	3.53	86.77	1.49	3.23	0.44	1.29
E4144	S11TX2897021	Btss1	61-81	3.79	72.29	1.74	3.25	0.53	1.24
E4145	S11TX2897021	Btss2	81-103	3.56	84.79	1.64	3.03	0.58	1.36
E4146	S11TX2897021	B't1	103-135	3.33	99.21	1.44	2.95	0.54	1.57
E4147	S11TX2897021	B't2	135-160	3.07	118.80	1.13	2.87	0.46	1.76
E4148	S11TX2897021	B't3	160-191	2.95	129.11	0.90	2.85	0.36	1.55
E4149	S11TX2897021	C1	191-227	2.85	138.92	0.69	2.80	0.24	1.26
E4150	S11TX2897021	C2	227-256	2.69	155.32	0.48	2.68	0.05	0.89
E4151	S11TX2897021	Cg1	256-290	3.75	74.15	1.46	3.65	0.25	1.30
E4152	S11TX2897021	Cg2	290-317	3.32	100.13	1.28	3.13	0.32	1.19
E4153	S11TX2897023	Ap	0-15	3.43	92.57	1.41	3.16	0.43	1.29
E4154	S11TX2897023	A	15-32	3.39	95.39	1.35	3.14	0.43	1.33
E4155	S11TX2897023	E1	32-49	3.42	93.43	1.37	3.15	0.44	1.27
E4156	S11TX2897023	E2	49-62	3.47	90.45	1.43	3.18	0.45	1.29
E4157	S11TX2897023	Bt	62-75	3.50	88.39	1.52	3.15	0.48	1.33
E4158	S11TX2897023	Btss	75-96	3.72	76.06	1.76	3.14	0.56	1.19
E4159	S11TX2897023	Btv1	96-126	3.39	95.61	1.58	2.93	0.57	1.81
E4160	S11TX2897023	Btv2	126-150	3.00	124.71	1.28	2.79	0.45	2.11
E4161	S11TX2897023	B't	150-190	2.73	150.73	0.87	2.70	0.29	1.81
E4162	S11TX2897023	BCt	190-215	2.72	151.96	0.60	2.70	0.17	1.15
E4163	S11TX2897023	Cg	215-247	2.87	136.47	0.66	2.83	0.21	1.16
E4164	S11TX2897023	C1	247-289	2.70	153.89	0.50	2.69	0.06	0.93
E4165	S11TX2897023	C2	289-322	2.89	135.22	0.69	2.83	0.25	1.21
E4166	S11TX2897025	Ap	0-9	4.34	49.26	1.65	4.03	0.35	1.36
E4167	S11TX2897025	E	9-38	4.43	46.28	1.73	4.00	0.41	1.26
E4168	S11TX2897025	E/Bt	38-59	4.14	56.85	1.60	3.86	0.35	1.50
E4169	S11TX2897025	Btg1	59-93	4.16	55.79	1.48	3.89	0.38	1.69
E4170	S11TX2897025	Btg2	93-147	4.20	54.60	1.36	3.96	0.38	1.75
E4171	S11TX2897025	Btg3	147-194	4.63	40.41	1.63	4.15	0.44	1.29
E4172	S11TX2897025	Bt1	194-231	5.09	29.36	1.67	4.55	0.46	0.94
E4173	S11TX2897025	Bt2	231-293	4.07	59.68	1.39	3.85	0.36	1.77
E4174	S11TX2897025	B'tg	293-336	5.32	25.00	1.68	4.83	0.42	0.85

Lab	Pedon	Horizon	Depth (cm)	Geometric Mean (φ)	Geometric Mean (μm)	Standard Deviation (σ_I)	Median (φ)	Skewness	Kurtosis
E4211	S11TX2897028	Btg1	190-250	4.27	51.83	1.59	3.93	0.40	1.56
E4212	S11TX2897028	Btg2	250-274	4.71	38.12	1.80	4.11	0.47	1.07
E4213	S11TX2897028	B't	274-301	3.87	68.19	1.39	3.77	0.27	1.38
E4214	S11TX2897028	BCtg	301-339	6.48	11.23	1.59	6.50	-0.05	0.80
E4215	S11TX2897028	BCt	339-389	5.75	18.54	1.68	5.38	0.28	0.86
E4216	S11TX2897028	CB	389-430	5.99	15.77	1.64	5.75	0.19	0.76
E4217	S11TX2897028	C1	430-457	4.19	54.95	0.82	4.05	0.42	1.49
E4218	S11TX2897028	C2	457-510	4.02	61.72	0.87	3.91	0.33	1.79
E4219	S11TX2897029	Ap	0-10	4.54	42.99	1.79	4.08	0.39	1.19
E4220	S11TX2897029	E	10-36	4.49	44.50	1.73	4.05	0.40	1.22
E4221	S11TX2897029	Bt1	36-68	4.31	50.45	1.65	3.97	0.37	1.35
E4222	S11TX2897029	Bt2	68-128	4.05	60.37	1.48	3.85	0.33	1.55
E4223	S11TX2897029	Bt3	128-153	4.18	55.15	1.40	3.92	0.39	1.81
E4224	S11TX2897029	Btg1	153-189	4.31	50.46	1.61	3.95	0.40	1.47
E4225	S11TX2897029	Btg2	189-226	4.68	38.93	1.72	4.15	0.45	1.19
E4226	S11TX2897029	B't	226-263	6.03	15.34	1.72	5.90	0.09	0.75
E4227	S11TX2897029	BC	263-314	5.91	16.63	1.53	5.50	0.35	0.82
E4228	S11TX2897029	CB	314-333	6.42	11.71	1.57	6.40	0.00	0.75
E4229	S11TX2897029	C1	333-362	4.40	47.26	1.10	4.19	0.46	1.51
E4230	S11TX2897029	C2	362-390	4.11	57.90	0.73	3.99	0.39	1.43

APPENDIX D

SPATIAL STATISTICAL ANALYSES

AND OBSEVRATIONS

Table D-1. Tukey-type multiple comparison testing of intermound observations.

	Terrace level					
Feature	*T-1*	*T-2*	*T-3*	*T-4*	*T-5*	*Upland*
Intermound	809	751	733	797	834	669
Mound	55	65	183	186	49	43
Ridge	173	128	3	19	14	14
Total	1037	944	919	1002	897	726

	T-1	T-2	T-3	T-4	T-5	Upland
Intermound	0.780	0.796	0.798	0.795	0.930	0.921
1 X/n+1	***0.779***	***0.795***	***0.797***	***0.795***	***0.929***	***0.920***
2 X+1/n+1	0.780	0.796	0.798	0.796	0.930	0.922
p'of 1	***61.96***	***63.08***	***63.22***	***63.08***	***74.55***	***73.57***
p'of 2	62.03	63.15	63.29	63.15	74.66	73.78
p'	61.995	63.115	63.255	63.115	74.605	73.675

Intermound: : Tukey-Type Multiple Comparison Testing

(i):	T-4	T-2	T-1	T-3	Upland	T-5
($P_i = X_i/n_i$):	0.795	0.796	0.780	0.798	0.921	0.930
(P'_i, in degrees):	63.115	63.115	61.995	63.255	73.675	74.605

Comparison *B vs. A*	*Difference* $P'_B - P'_A$	SE	q	$q_{0.05,\infty,6}$	*Conclusion*
T-2 vs. T-1	1.12	1.12	0.00	4.030	Do not reject H_0: T-2 = T-1
T-3 vs. T-1	1.26	1.13	0.13	4.030	Do not reject H_0: T-3 = T-1
T-4 vs. T-1	1.12	1.10	0.02	4.030	Do not reject H_0: T-4 = T-1
T-5 vs. T-1	12.61	1.14	11.47	4.030	Reject H_0: T-5 = T-1
Upland vs. T-1	11.68	1.23	10.45	4.030	Reject H_0: Upland = T-1
T-3 vs. T-2	0.14	1.15	-1.01	4.030	Do not reject H_0: T-3 = T-2
T-4 vs. T-2	0	1.12	-1.12	4.030	Do not reject H_0: T-4 = T-2
T-5 vs. T-2	11.49	1.16	10.33	4.030	Reject H_0: T-5 = T-2
Upland vs. T-2	10.56	1.25	9.31	4.030	Reject H_0: Upland = T-2
T-3 vs. T-4	0.14	1.14	-1.00	4.030	Do not reject H_0: T-3 = T-4
T-5 vs. T-3	11.35	1.17	10.18	4.030	Reject H_0: T-5 = T-3
Upland vs. T-3	10.42	1.26	9.16	4.030	Reject H_0: Upland = T-3
T-5 vs. T-4	11.49	1.15	10.34	4.030	Reject H_0: T-5 = T-4
Upland vs. T-4	10.56	1.24	9.32	4.030	Reject H_0: Upland = T-4
T-5 vs. Upland	0.93	1.22	-0.29	4.030	Do not reject H_0: T-5 = Upland

Overall conclusion: T-4 = T-2 = T-1 = T-3 and Upland = T-5.

Table D- 2. Tukey-type multiple comparison testing of ridge observations.

	Terrace level					
Feature	*T-1*	*T-2*	*T-3*	*T-4*	*T-5*	*Upland*
Intermound	809	751	733	797	834	669
Mound	55	65	183	186	49	43
Ridge	173	128	3	19	14	14
Total	1037	944	919	1002	897	726

	T-1	T-2	T-3	T-4	T-5	Upland
Ridge	0.167	0.136	0.003	0.019	0.016	0.019
1 X/n+1	***0.167***	***0.135***	***0.0033***	***0.019***	***0.016***	***0.019***
2 X+1/n+1	0.168	0.137	0.0043	0.020	0.017	0.021
p'of 1	***24.12***	***21.56***	***3.29***	***7.92***	***7.27***	***7.92***
p'of 2	24.2	21.72	3.76	8.13	7.49	8.33
p'	24.16	21.64	3.525	8.025	7.38	8.125

Ridge: Tukey-Type Multiple Comparison Testing

(i):	T-3	T-5	T-4	Upland	T-2	T-1
($P_i = X_i/n_i$):	0.003	0.016	0.019	0.019	0.136	0.167
(P'_i, in degrees):	3.525	7.38	8.025	8.125	21.64	24.16

Comparison *B vs. A*	*Difference* $P'_B - P'_A$	SE	q	$q_{0.05,\infty,6}$	*Conclusion*
T-1 vs. T-2	2.52	1.11	1.41	4.030	Do not reject H_0: T-1 = T-2
T-1 vs. T-3	20.635	1.11	19.52	4.030	Reject H_0: T-1 = T-3
T-1 vs. T-4	16.135	1.10	15.04	4.030	Reject H_0: T-1 = T-4
T-1 vs. T-5	16.78	1.12	15.66	4.030	Reject H_0: T-1 = T-5
T-1 vs. Upland	16.035	1.23	14.80	4.030	Reject H_0: T-1 = Upland
T-2 vs. T-3	18.115	1.15	16.97	4.030	Reject H_0: T-2 = T-3
T-2 vs. T-4	13.615	1.13	12.48	4.030	Reject H_0: T-2 = T-4
T-2 vs. T-5	14.26	1.15	13.11	4.030	Reject H_0: T-2 = T-5
T2 vs. Upland	13.515	1.20	12.32	4.030	Reject H_0: T-2 = Upland
T-4 vs. T-3	4.5	1.12	3.38	4.030	Do not reject H_0: T-4 = T-3
T-5 vs. T-3	3.855	1.17	2.69	4.030	Do not reject H_0: T-5 = T-3
Upland vs. T-3	4.6	1.26	3.34	4.030	Do not reject H_0: Upland = T-3
T-4 vs. T-5	0.645	1.13	-0.48	4.030	Do not reject H_0: T-4 = T-5
Upland vs. T-4	0.1	1.24	-1.14	4.030	Do not reject H_0: Upland = T-4
Upland vs. T-5	0.745	1.26	-0.51	4.030	Do not reject H_0: Upland = T-5

Overall conclusion: T-3 = T-4 = T-5 = Upland and T-1 = T-2.

Table D- 3. Tukey-type multiple comparison testing of mound observations.

	Terrace level					
Feature	*T-1*	*T-2*	*T-3*	*T-4*	*T-5*	*Upland*
Intermound	809	751	733	797	834	669
Mound	55	65	183	186	49	43
Ridge	173	128	3	19	14	14
Total	1037	944	919	1002	897	726

	T-1	T-2	T-3	T-4	T-5	Upland
Mound	0.053	0.069	0.199	0.186	0.055	0.059
1 X/n+1	***0.053***	***0.069***	***0.199***	***0.185***	***0.055***	***0.059***
2 X+1/n+1	0.054	0.070	0.200	0.186	0.056	0.061
p'of 1	***13.31***	***15.23***	***26.49***	***25.47***	***13.56***	***14.06***
p'of 2	13.44	15.34	26.57	25.55	13.69	14.3
p'	13.375	15.285	26.53	25.51	13.625	14.18

Mound: Tukey-Type Multiple Comparison Testing

(i):	T-1	T-5	Upland	T-2	T-4	T-3
($P_i = X_i/n_i$):	0.053	0.055	0.059	0.069	0.186	0.199
(P'_i, in degrees):	13.375	13.625	14.18	15.285	25.51	26.53

Comparison *B vs. A*	*Difference* $P'_B - P'_A$	SE	q	$q_{0.05,\infty,6}$	*Conclusion*
T-2 vs. T-1	1.91	1.12	0.79	4.030	Do not reject H_0: T-2 = T-1
T-3 vs. T-1	13.155	1.13	12.02	4.030	Reject H_0: T-3 = T-1
T-4 vs. T-1	12.135	1.10	11.03	4.030	Reject H_0: T-4 = T-1
T-5 vs. T-1	0.25	1.14	-0.89	4.030	Do not reject H_0: T-5 = T-1
Upland vs. T-1	0.805	1.16	-0.36	4.030	Do not reject H_0: Upland = T-1
T-3 vs. T-2	11.245	1.15	10.09	4.030	Reject H_0: T-3 = T-2
T-4 vs. T-2	10.225	1.12	9.11	4.030	Reject H_0: T-4 = T-2
T-2 vs. T-5	1.66	1.15	0.51	4.030	Do not reject H_0: T-2 = T-5
T2 vs. Upland	1.105	1.20	-0.09	4.030	Do not reject H_0: T-2 = Upland
T-3 vs. T-4	1.02	1.14	-0.12	4.030	Do not reject H_0: T-3 = T-4
T-3 vs. T-5	12.905	1.16	11.74	4.030	Reject H_0: T-3 = T-5
T-3 vs. Upland	12.35	1.21	11.14	4.030	Reject H_0: T-3 = Upland
T-4 vs. T-5	25.51	1.13	24.38	4.030	Reject H_0: T-4 = T-5
T-4 vs. Upland	11.33	1.18	10.15	4.030	Reject H_0: T-4 = Upland
Upland vs. T-5	0.555	1.26	-0.70	4.030	Do not reject H_0: Upland = T-5

Overall conclusion: T-1 = T-5 = Upland = T-2 and T-4 = T-3.

Table D- 4. Tukey-Kramer test with unequal sample sizes of mound height measurements.

Mound Height: The Tukey-Kramer Test with Unequal Sample Sizes

k =	6
s^2 = Error MS =	0.03989
Error DF =	467
$q_{0.05,467,6}$ =	4.096

i:	**T-3**	**Upland**	**T-5**	**T-1**	**T-2**	**T-4**
X_i:	0.52	0.528571429	0.5384	0.5646	0.6003774	0.7284962
n_i:	145	42	50	50	53	133

Comparison *B* vs. *A*	*Difference* (X_B-X_A)	SE	*q*	*Conclusion*
T-4 vs. T-2	0.128118882	0.022939809	5.585	Reject
T-4 vs. T-1	0.163896241	0.023426737	6.99612	Reject
T-4 vs. T-5	0.190096241	0.023426737	8.1145	Reject
T-4 vs. Upland	0.199924812	0.02499572	7.99836	Reject
T-4 vs. T-3	0.208496241	0.016955463	12.2967	Reject
T-2 vs. T-1	0.035777358	0.027841508	1.28504	Do not reject
T-2 vs. T-5	0.061977358	0.027841508	2.22608	Do not reject
T-2 vs. Upland	0.07180593	0.029174022	2.4613	Do not reject
T-2 vs. T-3	0.080377358	0.022667715	3.5459	Do not reject
T-1 vs. T-5	0.0262	0.028244057	0.92763	Do not reject
T-1 vs. Upland	0.036028571	0.029558429	1.21889	Do not reject
T-1 vs. T-3	0.0446	0.023160364	1.9257	Do not reject
T-5 vs. Upland	0.009828571	0.029558429	0.33251	Do not reject
T-5 vs. T-3	0.0184	0.023160364	0.79446	Do not reject
Upland vs. T-3	0.008571429	0.024746241	0.34637	Do not reject

Thus we conclude that T-3 = Upland = T-5 = T-1 = T-2 ≠ T-4.

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
307	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
308	T1	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
309	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	0.25m mound excluded
310	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Dist	SE oil field road dist mound
311	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
312	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
313	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	
314	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
315	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
316	T1	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
317	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	Int	
318	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
319	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
320	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
321	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	
322	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	W Grid points in Df
323	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Int	
324	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
325	T1	Rd	Yes	0.50	13.0	20.0	290.0	Int	Int	Mnd	Int	
326	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded .25m
327	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
328	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
329	T1	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
330	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
331	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
332	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
333	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
334	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
335	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
336	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
337	T1	Df	Yes	0.80	26.0	26.0	401.0	Mnd	Int	Int	Int	
338	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
339	T1	Df	Yes	0.52	26.0	35.0	630.0	Int	Int	Int	Int	
340	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
341	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
342	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
343	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
344	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	Stock tank
345	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
346	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
347	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	MRdg	
348	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
349	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	Int	
350	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
351	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	
352	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
353	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
354	T1	Df	No	0.00	0.0	0.0	0.0	Sha	MRdg	MRdg	MRdg	
355	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	
356	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
357	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
358	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
359	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
360	T1	Df	Yes	0.34	13.0	15.0	215.0	Dist	Dist	Int	Int	
361	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
362	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
363	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
364	T1	Rd	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
365	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
366	T1	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Dist	Dist	Private road
367	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Mound .25m excluded
430	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
431	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	Int	
432	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
433	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Dist	Drainage ditch.
434	T1	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
435	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
436	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
437	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
438	T1	Df	Yes	0.32	25.0	26.0	970.0	Int	Int	Mnd	Int	
439	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
440	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
441	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
442	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
443	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
444	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	
445	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
446	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
447	T1	Df	Yes	0.58	43.0	37.0	1450.0	Mnd	Int	Mnd	Mnd	
448	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Oth	Draw (Drainageway)
449	T1	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Int	Adjacent to creek.
450	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
451	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	
452	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	Dist	Dist	Private road

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
453	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
454	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
455	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	Int	
456	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Int	
457	T1	Rd	Yes	0.55	32.0	44.0	1182.0	Mnd	Mnd	Mnd	Int	
458	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	
459	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
460	T1	Df	Yes	0.42	26.0	26.0	447.0	Int	Int	Mnd	Int	
461	T1	Df	Yes	0.56	26.0	26.0	648.0	Int	Mnd	MRdg	Int	
398	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
399	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
400	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
401	T1	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
402	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	MRdg	
403	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
404	T1	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
405	T1	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
406	T1	Rd	Yes	0.36	14.0	20.0	229.0	Int	Int	Int	Int	
407	T1	Rd	Yes	0.40	20.0	20.0	188.0	Mnd	Mnd	Int	Int	
408	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	MRdg	Ditch excavation.
409	T1	Df	Yes	0.30	14.0	20.0	200.0	Int	Int	Int	Int	
410	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
411	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
412	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
413	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	
414	T1	Df	Yes	0.44	20.0	25.0	344.0	Int	Mnd	Int	Int	
415	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	MRdg	
416	T1	Rd	Yes	0.75	25.0	38.0	598.0	Mnd	Int	Int	Int	
417	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
418	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	
419	T1	Rd	Yes	0.44	19.0	19.0	300.0	Int	Int	Int	Int	
420	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	Int	
421	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
422	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
423	T1	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
424	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Dist	Private Road
425	T1	Df	Yes	0.70	32.0	40.0	961.0	Int	Int	Mnd	Int	
426	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	.15m Mound excluded; PR
427	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Dist	Int	Int	Drainage ditch
428	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	
429	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
462	T1	Df	Yes	0.50	25.0	24.0	462.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
463	T1	Df	Yes	0.34	20.0	20.0	330.0	Int	Int	Int	Int	
464	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
465	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Private Road
466	T1	Df	Yes	0.56	20.0	14.0	178.0	MRdg	Mnd	Int	Int	
467	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
468	T1	Df	Yes	0.70	46.0	44.0	1575.0	Int	Int	Int	Mnd	
469	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
470	T1	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	Mound 0.26m excluded
471	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
472	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
473	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
474	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
475	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
476	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	MRdg	
477	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	MRdg	Int	MRdg	
478	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
479	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
480	T1	Df	Yes	0.70	20.0	32.0	435.0	Int	Mnd	Int	Int	
481	T1	Df	Yes	0.60	25.0	29.0	555.0	MRdg	Mnd	Int	Int	
482	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	
483	T1	Df	Yes	0.52	38.0	35.0	723.0	Int	Mnd	Int	Int	
485	T1	Df	Yes	0.46	32.0	32.0	562.0	Sha	Mnd	Mnd	Int	
486	T1	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	Mound excluded 0.27m height
487	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Dist	Possible disturbed meand ridge
488	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
489	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Sha	Int	Mound excluded 0.25m; PR
490	T1	Df	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	Int	
491	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	OutofMU	Dist	Stock tank spillway
492	T1	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	MRdg	MRdg	
368	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Dist	Int	Private road
369	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	Private Road
370	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Dist	Int	Private road
371	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Dist	Private road
372	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
373	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
374	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
375	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
376	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
377	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Airstrip
378	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Airstrip
379	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
380	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
381	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	MRdg	Man made ditch
382	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	MRdg	
383	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
384	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	Private Road
385	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	Meander Ridge dissecting
386	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	Man made ditch
387	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	
388	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
389	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
390	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
391	T1	Df	Yes	0.60	32.0	31.0	482.0	Int	Int	Int	Mnd	
392	T1	Df	No	0.00	0.0	0.0	0.0	Int	Oth	Int	Int	Other-0.26m mound excluded
393	T1	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
394	T1	Df	Yes	0.53	24.0	14.0	580.0	Int	Int	Mnd	Int	
395	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	MRdg	
396	T1	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	MRdg	
397	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	0.2m mound excluded
493	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Int	
494	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
495	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	MRdg	
496	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
497	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	MRdg	
498	T1	Rd	Yes	0.68	15.0	15.0	165.0	Int	Int	Int	Int	
499	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
500	T1	Df	Yes	0.64	26.0	30.0	405.0	Int	Int	Int	Int	
501	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
502	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Int	
503	T1	Df	Yes	0.50	15.0	21.0	231.0	OutofMU	OutofMU	Int	Int	
504	T1	Df	Yes	0.62	22.0	21.0	393.0	MRdg	MRdg	Mnd	MRdg	
505	T1	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
506	T1	Df	Yes	0.95	32.0	25.0	395.0	MRdg	Mnd	MRdg	MRdg	
507	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
508	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	MRdg	
509	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	Int	
510	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	
512	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	
513	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
514	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	MRdg	
515	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Dist	Drainage
516	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	
517	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
518	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
519	T1	Df	Yes	0.44	22.0	19.0	368.0	Mnd	MRdg	Mnd	MRdg	
520	T1	Df	Yes	0.55	24.0	22.0	665.0	Mnd	Int	Int	Int	
521	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Possible remnant eroded mound
522	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
523	T1	Df	Yes	0.35	12.0	15.0	112.0	Dist	Mnd	Int	Int	Private road
524	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mounds not present in mapunit
525	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
526	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
527	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Int	Drainage ditch
529	T1	Df	Yes	0.44	12.0	18.0	238.0	Int	Mnd	Int	Mnd	
530	T1	Df	Yes	0.34	30.0	34.0	567.0	Dist	Int	Mnd	Mnd	Stock tank impoundment
531	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	Private road
532	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
533	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
534	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
535	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
536	T1	Df	Yes	0.62	30.0	26.0	525.0	Dist	Mnd	Mnd	Int	Private road
537	T1	Df	Yes	0.56	31.0	40.0	895.0	OutofMU	Mnd	OutofMU	Dist	Private road
538	T1	Df	Yes	0.34	25.0	30.0	601.0	Mnd	Mnd	Int	Mnd	
539	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
540	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
541	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Dist	OutofMU	Int	
542	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
543	T1	Df	Yes	0.90	30.0	32.0	587.0	Int	Int	Int	Int	
544	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
545	T1	Df	Yes	0.75	38.0	32.0	777.0	Int	Int	MRdg	Mnd	
546	T1	Df	Yes	0.58	32.0	24.0	525.0	Int	Int	Mnd	Int	
547	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
548	T1	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Oth	OutofMU	Gully
549	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
550	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
551	T1	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	Gully
552	T1	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
553	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
554	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
555	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
589	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
590	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Dist	Int	Private road
591	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
592	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Oth	gully
593	T1	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	Pipeline?
594	T1	Df	Yes	0.58	46.0	48.0	1350.0	Int	Mnd	Int	Dist	Private road

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
595	T1	Df	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	MRdg	Mound measured in adj grid
596	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
597	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
598	T1	Df	Yes	0.62	32.0	31.0	575.0	Int	Int	Int	Mnd	
599	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
600	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	Int	
601	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	
602	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Dist	County road
603	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
604	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
605	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
606	T1	Rd	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	MRdg	
607	T1	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
608	T1	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
609	T1	Df	Yes	0.62	27.0	24.0	375.0	Mnd	Mnd	Int	Int	
556	T1	Df	Yes	1.30	20.0	25.0	600.0	Mnd	Int	Int	Int	Ridge similar to a mound
557	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	OutofMU	
558	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
559	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
560	T1	Df	Yes	0.68	36.0	30.0	850.0	Mnd	Int	Mnd	Int	
561	T1	Df	No	0.00	0.0	0.0	0.0	Wat	Wat	Int	Int	Intermittent stream
562	T1	Df	No	0.00	0.0	0.0	0.0	Wat	Int	Int	Int	
563	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	Int	
564	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
565	T1	Df	Yes	0.76	31.0	34.0	650.0	Mnd	Int	Int	Int	0.15 m mounds excluded
566	T1	Df	Yes	0.48	18.0	23.0	223.0	Int	MRdg	Mnd	Int	
567	T1	Df	Yes	0.44	20.0	18.0	317.0	Int	Int	Int	Mnd	
568	T1	Df	No	0.00	0.0	0.0	0.0	Sha	Int	MRdg	Int	
569	T1	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	MRdg	
570	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
571	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	
572	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
573	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
574	T1	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	Int	
575	T1	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Oth	Wat	River Bluff
576	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
577	T1	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	MRdg	
578	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
579	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
580	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
581	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
582	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
583	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
584	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
585	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
586	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
587	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
588	T1	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
629	T2	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	Private road
630	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
631	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
632	T2	Df	No	0.00	0.0	0.0	0.0	Oth	Sha	Oth	Int	Gully
633	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
634	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
635	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
636	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
637	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
638	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
639	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
640	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Mnd	MRdg	
641	T2	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	Int	
642	T2	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Dist	MRdg	
643	T2	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Dist	
644	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	MRdg	
645	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Oth	Int	Gully
646	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Oth	Gully
647	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
648	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
649	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
650	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
651	T2	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	OutofMU	OutofMU	Stock tank dam
652	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
653	T2	Df	No	0.00	0.0	0.0	0.0	Wat	Int	OutofMU	Dist	Stock tank and impoundment
654	T2	Df	Yes	0.33	24.0	21.0	220.0	Int	Dist	Int	Dist	Man made drainage
655	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	
656	T2	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	
657	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
658	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	OutofMU	Wat	Stock tank
659	T2	Df	Yes	0.72	22.0	28.0	500.0	Int	Int	Int	Int	
660	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
661	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Dist	OutofMU	Int	Edge of Stock tank
662	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
663	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
664	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
665	T2	Df	Yes	0.50	28.0	30.0	457.0	Int	Mnd	Int	Int	
666	T2	Df	Yes	0.56	26.0	24.0	603.0	Mnd	Int	Int	Int	
667	T2	Df	Yes	0.67	32.0	31.0	756.0	Sha	Int	MRdg	MRdg	
668	T2	Df	Yes	0.56	24.0	27.0	438.0	Int	Int	Int	Int	
669	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
670	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
671	T2	Df	Yes	0.52	27.0	29.0	615.0	Int	Mnd	Int	MRdg	
672	T2	Df	Yes	0.68	31.0	34.0	614.0	MRdg	MRdg	MRdg	Mnd	
673	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
674	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
675	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
676	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
677	T2	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
678	T2	Df	Yes	0.68	26.0	29.0	535.0	Int	MRdg	Int	Int	
679	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
610	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
611	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
612	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
613	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
614	T2	Df	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Sha	Int	
615	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
616	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
617	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
618	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
619	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
620	T2	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	Oil field pad
621	T2	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Oil field pad
622	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
623	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
624	T2	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Gully
625	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
626	T2	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Gully
627	T2	Df	No	0.00	0.0	0.0	0.0	Oth	Int	Oth	Int	Gully
628	T2	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Edge of mu, gully
748	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
749	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	OutofMU	MRdg	
750	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
751	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
752	T2	Rd	Yes	0.44	21.0	20.0	285.0	Int	Int	Int	Int	
753	T2	Rd	Yes	0.88	37.0	35.0	927.0	Int	Mnd	Int	Int	
754	T2	Rd	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	Ridge is truncated.
755	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	MRdg	Ridge truncated.

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
756	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	Ridge truncated.
757	T2	Rd	Yes	0.42	23.0	16.0	200.0	Mnd	MRdg	Mnd	Sha	
758	T2	Rd	Yes	0.72	36.0	24.0	697.0	Mnd	Sha	MRdg	Int	
759	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	OutofMU	Tank dam and other modified.
760	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	Ridge truncated.
761	T2	Df	Yes	0.46	29.0	20.0	212.0	Mnd	Int	Int	Int	
762	T2	Df	Yes	0.48	25.0	22.0	377.0	Sha	Sha	Int	Int	
763	T2	Df	Yes	0.68	31.0	44.0	1130.0	OutofMU	OutofMU	Int	Int	Mound in Derly MU
764	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	Drainage ditch present.
765	T2	Df	Yes	0.60	31.0	21.0	398.0	Mnd	Mnd	Int	Mnd	
766	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
767	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	Eroded Mound on slope.
768	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mounds on slope.
769	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
770	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
771	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
772	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
773	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
774	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
775	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
776	T2	Rd	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	Int	
777	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
778	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
779	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
780	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
781	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
782	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
783	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
784	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
785	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
786	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Terrace riser
787	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
788	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Terrace riser
789	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
790	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Terrace riser
791	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
792	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
793	T2	Rd	Yes	0.56	24.0	34.0	505.0	Int	Sha	Int	Mnd	
794	T2	Rd	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
795	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
796	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Pipeline scar
797	T2	Rd	Yes	0.68	51.0	39.0	1268.0	Int	Mnd	Mnd	Mnd	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
798	T2	Rd	Yes	0.90	78.0	66.0	3247.0	Mnd	Int	Mnd	Mnd	
799	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
800	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Sha	Int	Sha	Oil well pad
801	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
802	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	Oil field road
803	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
804	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
805	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
806	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
807	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
808	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Dist	Private road
809	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Dist	Dist	Private road
835	T2	Rd	Yes	0.50	26.0	28.0	205.0	Mnd	Int	Int	MRdg	
836	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.2 m height
837	T2	Rd	Yes	0.74	32.0	28.0	605.0	Mnd	MRdg	Mnd	Int	
838	T2	Rd	Yes	0.64	35.0	30.0	905.0	Sha	Sha	Mnd	Int	
839	T2	Rd	Yes	0.32	30.0	23.0	348.0	Int	Int	MRdg	Mnd	Truncated ridge
840	T2	Rd	Yes	0.52	27.0	27.0	495.0	Int	Sha	Mnd	MRdg	Truncated meander ridge
841	T2	Rd	Yes	0.64	36.0	32.0	775.0	Mnd	MRdg	Mnd	MRdg	
842	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
843	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	MRdg	MRdg	Int	pipeline
844	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
845	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound 0.25m excluded
846	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Drainage ditch
847	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	MRdg	Int	MRdg	drainage ditch
848	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	Drainage ditch
849	T2	Rd	Yes	0.54	35.0	40.0	1389.0	Int	Int	Int	Mnd	
850	T2	Rd	Yes	0.30	28.0	24.0	555.0	Int	Mnd	Int	Mnd	
851	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Drainage ditch
852	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
853	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
854	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
855	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
856	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	Stock tank dam
857	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
858	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
859	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	
860	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
861	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
862	T2	Rd	Yes	0.70	30.0	30.0	518.0	Mnd	Int	Mnd	Int	
863	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Well pad
864	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Dist	Dist	Sha	Well site

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
865	T2	Rd	Yes	0.80	35.0	16.0	465.0	Mnd	Dist	Int	Int	drainage ditch
866	T2	Rd	Yes	0.64	34.0	38.0	1206.0	Int	Int	Int	Mnd	Mound/Meander ridge?
867	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	MRdg	Int	Int	
868	T2	Rd	Yes	0.90	28.0	28.0	553.0	Int	Mnd	Mnd	Mnd	
869	T2	Rd	Yes	0.90	28.0	26.0	531.0	Int	Int	Sha	Sha	Mound/Meander ridge?
870	T2	Rd	Yes	0.66	28.0	20.0	397.0	Int	Int	Int	Mnd	
871	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	MRdg	
872	T2	Rd	Yes	0.52	18.0	21.0	298.0	Mnd	MRdg	Mnd	MRdg	
873	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
874	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
875	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
876	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
877	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
878	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
879	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	Disturbed? constructing ditch
880	T2	Rd	Yes	0.72	35.0	32.0	806.0	Int	Int	Int	Mnd	
881	T2	Rd	Yes	0.33	15.0	17.0	184.0	Sha	Int	Sha	Int	
882	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
883	T2	Rd	Yes	0.34	25.0	21.0	162.0	Int	Int	Int	Mnd	
884	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
885	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
886	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
887	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Sha	
888	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
889	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
890	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Sha	Mound recorded in adj grid
891	T2	Rd	Yes	0.80	42.0	35.0	905.0	Int	Mnd	MRdg	Sha	
892	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	Possibly dozer windrow?
893	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
894	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
895	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
896	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
680	T2	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
681	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
682	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Possibly eroded mounds
683	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	MRdg	OutofMU	Int	
684	T2	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
685	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	MRdg	
686	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	MRdg	
687	T2	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	Int	
688	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
689	T2	Df	Yes	0.62	32.0	34.0	800.0	Int	Mnd	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
690	T2	Df	No	0.00	0.0	0.0	0.0	Dist	MRdg	MRdg	MRdg	
691	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	OutofMU	
692	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
693	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
694	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
695	T2	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	
696	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Wat	OutofMU	Int	Stock tank
697	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
698	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Mnd	Int	
699	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
700	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
701	T2	Df	Yes	0.32	53.0	30.0	1259.0	Mnd	OutofMU	Int	Dist	Private Road
702	T2	Df	Yes	0.40	28.0	28.0	606.0	Int	Int	Int	Mnd	
703	T2	Df	Yes	0.93	44.0	45.0	1141.0	Int	Int	Int	Mnd	
704	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
705	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
706	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
707	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
708	T2	Df	No	0.00	0.0	0.0	0.0	Int	Wat	Int	Int	
709	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
710	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	OutofMU	
711	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
712	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
713	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
714	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
715	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
716	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
717	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
718	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	MRdg	MRdg	MRdg	
719	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	MRdg	MRdg	
810	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Dist	
811	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Int	Private road
812	T2	Rd	Yes	0.50	36.0	34.0	706.0	Sha	Sha	Mnd	Int	
813	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
814	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
815	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
816	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
817	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
818	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
819	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Sha	Private road
820	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Sha	Int	Int	Private road
821	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
822	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
823	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Terrace riser
824	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	
825	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
826	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Int	Private road
827	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
828	T2	Rd	No	0.00	0.0	0.0	0.0	Wat	OutofMU	Dist	Dist	Stock tank and Private road
829	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Dist	Dist	Private road
830	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Private road/stock tank dam
831	T2	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Dist	Private road
832	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
833	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	Ridge possibly man made
834	T2	Rd	Yes	0.76	35.0	37.0	949.0	Int	Mnd	Mnd	Int	
720	T2	Df	No	0.00	0.0	0.0	0.0	Sha	MRdg	MRdg	MRdg	
721	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Int	
722	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	
723	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	OutofMU	MRdg	
724	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
725	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
726	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
727	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	MRdg	
728	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
729	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
730	T2	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
731	T2	Df	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	Int	
732	T2	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	MRdg	MRdg	
733	T2	Df	No	0.00	0.0	0.0	0.0	Int	Sha	MRdg	MRdg	
734	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
735	T2	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	MRdg	Int	
736	T2	Rd	Yes	0.95	80.0	50.0	2775.0	Int	Mnd	Mnd	Mnd	
737	T2	Rd	Yes	1.05	42.0	40.0	970.0	Dist	Int	Int	Mnd	Old road
738	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Wat	Int	Stock tank
739	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
740	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
741	T2	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
742	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
743	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	
744	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
745	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
746	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	MRdg	MRdg	
747	T2	Rd	No	0.00	0.0	0.0	0.0	MRdg	Sha	OutofMU	Int	
897	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
898	T2	Rd	Yes	0.48	28.0	24.0	381.0	Int	Int	Int	Int	
899	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
900	T2	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
901	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
902	T2	Rd	Yes	0.50	19.0	26.0	288.0	Int	Mnd	Mnd	Int	
903	T2	Rd	Yes	0.52	37.0	28.0	530.0	Sha	Int	MRdg	Mnd	
904	T2	Rd	Yes	0.30	27.0	30.0	630.0	Int	Int	Int	Mnd	
905	T2	Rd	Yes	0.32	20.0	22.0	364.0	Mnd	MRdg	MRdg	MRdg	
906	T2	Rd	Yes	0.62	32.0	31.0	440.0	Mnd	Mnd	Mnd	Sha	
907	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
908	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
909	T2	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Dist	SE corner stocktank dam.
2	T3	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	SW&SE possibly crop terrace.
3	T3	Df	No	0.00	0.0	0.0	0.0	Wat	Dist	Dist	Int	Stocktank and dam included
4	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	Stocktank Dam included
5	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
6	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Grid near dissecting channel
7	T3	Df	Yes	0.55	30.0	32.0	581.0	Mnd	Mnd	Int	Int	
8	T3	Df	Yes	0.50	30.0	25.0	655.0	Mnd	Mnd	Int	Int	
9	T3	Df	Yes	0.70	32.0	30.0	740.0	Int	Int	Mnd	Mnd	
10	T3	Df	Yes	0.60	25.0	25.0	457.0	Mnd	Dist	Int	Int	NE stocktank dam
11	T3	Df	Yes	0.35	25.0	25.0	738.0	Mnd	Mnd	Dist	Mnd	SW stocktank dam
12	T3	Df	Yes	0.90	30.0	25.0	517.0	Int	Mnd	Int	Int	Mound possibly cut by NS road
13	T3	Df	Yes	0.35	20.0	25.0	334.0	Mnd	Int	Int	Int	
14	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
15	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
16	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
17	T3	Df	Yes	0.45	14.0	16.0	200.0	Int	Mnd	Int	Dist	SE possible roadcut
18	T3	Df	Yes	0.30	15.0	12.0	154.0	Mnd	Mnd	Int	Int	
19	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
20	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
21	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
22	T3	Df	Yes	0.80	18.0	20.0	202.0	Int	Int	Int	Int	Mound contacts southern edge
23	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Possible mound<30cm in grid
24	T3	Df	Yes	0.55	18.0	16.0	235.0	Mnd	Int	Int	Int	
25	T3	Df	Yes	0.60	13.0	14.0	96.0	Mnd	Int	Mnd	Int	
26	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
27	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Dist	
28	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
29	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	SE Barn
30	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 20cm

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
31	T3	Df	Yes	0.30	16.0	15.0	218.0	Int	Int	Mnd	Int	NW excluded mound 25cm
32	T3	Df	Yes	0.45	20.0	20.0	226.0	Mnd	Int	Dist	Int	SW stocktank dam;NE edge of M
33	T3	Df	Yes	0.40	22.0	20.0	170.0	Mnd	Int	Int	Int	
34	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Dist	Sha	Oth	NE&SE disturbed FM542
35	T3	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Dist	OutofMU	Old Road
36	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Mounds possible before road
38	T3	Df	Yes	0.50	30.0	32.0	475.0	Int	Mnd	Mnd	Int	Mounds appear disturbed.
39	T3	Df	Yes	0.35	20.0	25.0	625.0	Mnd	Int	Int	OutofMU	
40	T3	Df	Yes	0.70	30.0	35.0	805.0	Mnd	Mnd	Int	Int	
41	T3	Df	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Int	OutofMU	
42	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound 25cm excluded
44	T3	Df	Yes	0.35	35.0	40.0	797.0	Int	Int	Int	Dist	Stocktank dam
45	T3	Df	Yes	0.50	25.0	20.0	220.0	Sha	Sha	Int	Mnd	
46	T3	Df	Yes	0.50	20.0	20.0	140.0	Int	Int	Int	Int	
47	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
48	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
49	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Wat	FM 542 disturbed grid
51	T3	Df	Yes	0.45	25.0	30.0	312.0	Int	Int	Int	OutofMU	Mound on boundary
52	T3	Df	No	0.00	0.0	0.0	0.0	Wat	Int	Int	Int	Grid disturbed by stocktank
53	T3	Df	Yes	0.65	25.0	20.0	230.0	Int	Int	Int	Mnd	
54	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	NW - Mound present
55	T3	Df	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Sha	Int	NE - Mound 55cm in RaB
56	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
57	T3	Df	Yes	0.40	20.0	25.0	240.0	Int	Int	Int	Mnd	
58	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Old Road and FM542
59	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	Distrubed FM 542
60	T3	Df	Yes	0.30	25.0	30.0	230.0	Int	Int	Int	Mnd	
61	T3	Df	Yes	0.40	20.0	15.0	205.0	Int	Mnd	Int	Mnd	
62	T3	Df	Yes	0.60	25.0	25.0	285.0	Mnd	Sha	Int	Int	
63	T3	Df	Yes	0.60	30.0	30.0	385.0	Sha	Sha	Mnd	Int	
64	T3	Df	Yes	0.75	35.0	35.0	868.0	Int	Int	Mnd	Int	
65	T3	Df	Yes	0.50	35.0	40.0	1040.0	Int	Mnd	Int	Int	Mound extends SW to NE
66	T3	Df	Yes	0.65	25.0	25.0	285.0	Dist	Int	Dist	Mnd	FM 542 bar ditch
67	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Possible stocktank within grid
68	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	70cm mound nearby
69	T3	Df	Yes	0.50	35.0	40.0	975.0	Mnd	Mnd	Int	Mnd	
70	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
71	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	Stocktank nearby
72	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
73	T3	Df	Yes	0.35	35.0	35.0	715.0	Mnd	Int	Int	Int	
74	T3	Df	Yes	0.70	50.0	25.0	1080.0	Sha	Int	Sha	OutofMU	
75	T3	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	MRdg	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
76	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
77	T3	Df	Yes	0.40	30.0	30.0	695.0	Int	Sha	Int	Mnd	
78	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
79	T3	Df	Yes	0.60	35.0	30.0	475.0	Dist	Mnd	Dist	Int	FM 542 bar ditch
80	T3	Df	Yes	0.80	32.0	20.0	597.0	Sha	Int	Sha	Mnd	
81	T3	Df	Yes	0.40	20.0	20.0	554.0	Int	Int	Mnd	Int	
82	T3	Df	Yes	0.45	20.0	20.0	275.0	Int	Int	Mnd	Mnd	
83	T3	Df	Yes	0.65	25.0	22.0	305.0	Dist	Mnd	Dist	Int	FM542
84	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
85	T3	Df	Yes	0.50	20.0	20.0	290.0	Wat	Mnd	Int	Int	
86	T3	Df	Yes	0.70	25.0	35.0	380.0	Int	Int	Int	Mnd	
87	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
88	T3	Df	Yes	0.40	20.0	20.0	160.0	Int	Int	Int	Int	
89	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
90	T3	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
91	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
92	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
93	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	CR253
94	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
95	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
96	T3	Df	Yes	0.30	20.0	20.0	190.0	Int	Int	Mnd	Oth	Eroded gully or channel
97	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
98	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
99	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
100	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
101	T3	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	NE eroded channel or ditch
102	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
103	T3	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	FM542
104	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
105	T3	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Channel near private road
106	T3	Df	Yes	1.00	25.0	35.0	470.0	Int	Int	Int	Int	
107	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound 20cm excluded
108	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Int	Private Road
109	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
110	T3	Df	Yes	0.35	18.0	25.0	120.0	Int	Int	Int	Int	
111	T3	Df	Yes	0.30	15.0	25.0	220.0	Sha	Int	Int	Int	
112	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
113	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Oth	Oth	Channel cuts thru grid
114	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
115	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
116	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
117	T3	Df	Yes	0.50	20.0	15.0	165.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
118	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
119	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
120	T3	Df	Yes	0.65	25.0	25.0	320.0	Mnd	Mnd	Mnd	Int	
121	T3	Df	Yes	0.30	20.0	25.0	240.0	Sha	Sha	Int	Mnd	
122	T3	Df	Yes	0.50	20.0	20.0	260.0	Mnd	Int	Int	Int	
123	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
124	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
125	T3	Df	Yes	0.75	20.0	30.0	320.0	Int	OutofMU	Int	Int	
126	T3	Df	Yes	0.45	20.0	25.0	320.0	Int	Int	Int	Int	
127	T3	Df	Yes	0.55	18.0	25.0	265.0	Int	Int	Int	Mnd	
128	T3	Df	Yes	0.75	35.0	25.0	555.0	Int	Int	Mnd	Mnd	
129	T3	Df	Yes	0.55	45.0	25.0	625.0	Sha	Sha	Int	Mnd	
130	T3	Df	Yes	0.55	25.0	20.0	390.0	Int	Int	Int	Mnd	
131	T3	Df	Yes	0.50	25.0	30.0	554.0	Mnd	Mnd	Int	Mnd	
132	T3	Df	Yes	0.40	15.0	25.0	315.0	Int	Int	Int	Mnd	
133	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
134	T3	Df	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Sha	Int	
135	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
136	T3	Df	No	0.00	0.0	0.0	0.0	Dist	OutofMU	Dist	OutofMU	Private Road
137	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	Dist	OutofMU	Int	Stocktank Dam
138	T3	Df	Yes	0.55	25.0	25.0	325.0	Sha	Mnd	Int	Mnd	
139	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Dist	Int	Storage Area?
140	T3	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Dist	Undetermined disturbed area
141	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
142	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Dist	Dist	CR 123
143	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Dist	CR 123
144	T3	Df	Yes	0.60	40.0	35.0	515.0	Int	Int	Int	Int	
145	T3	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	Private road
146	T3	Df	Yes	0.50	25.0	25.0	275.0	Mnd	Int	Mnd	Mnd	NS Elongated ridge
147	T3	Df	Yes	0.75	35.0	35.0	758.0	Int	Mnd	Int	Mnd	NS Elongated ridge
148	T3	Df	Yes	0.50	40.0	25.0	810.0	Mnd	Int	Int	Int	
149	T3	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	
150	T3	Df	Yes	0.70	20.0	20.0	455.0	Dist	Mnd	Int	Int	Private road
151	T3	Df	Yes	0.60	20.0	25.0	225.0	Mnd	Int	Sha	Int	
182	T3	Df	Yes	0.40	20.0	20.0	310.0	Int	Int	Mnd	Int	
183	T3	Df	Yes	0.65	25.0	30.0	480.0	Mnd	Int	Int	Mnd	
184	T3	Df	Yes	0.45	25.0	20.0	275.0	Mnd	Int	Int	Int	
185	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
186	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
187	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
188	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
189	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
190	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
191	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
192	T3	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	CR 125
193	T3	Df	Yes	0.30	25.0	25.0	350.0	Mnd	Int	Int	Int	
194	T3	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Wat	Stocktank
195	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
196	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
197	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
198	T3	Df	Yes	0.45	20.0	25.0	330.0	Int	Int	Mnd	Int	
199	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Sha	Int	
200	T3	Df	Yes	0.40	22.0	25.0	305.0	Int	Int	Int	Int	
201	T3	Df	Yes	0.60	30.0	25.0	345.0	Int	Int	Int	Mnd	
202	T3	Df	Yes	0.50	25.0	25.0	300.0	Mnd	Mnd	Int	Mnd	Mound extends SW/NE
203	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
204	T3	Rd	Yes	0.30	8.0	15.0	115.0	Int	Mnd	Int	Mnd	
205	T3	Rd	Yes	0.60	30.0	20.0	250.0	Int	Mnd	OutofMU	Mnd	
206	T3	Rd	Yes	0.70	40.0	25.0	860.0	Sha	Mnd	Sha	Int	
207	T3	Rd	Yes	0.70	40.0	15.0	665.0	Mnd	Int	Mnd	Mnd	
208	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Wat	
209	T3	Rd	Yes	0.70	25.0	30.0	380.0	Int	Mnd	Mnd	Int	
210	T3	Rd	Yes	0.50	20.0	25.0	280.0	Int	Mnd	Int	Mnd	
211	T3	Rd	Yes	0.60	25.0	25.0	265.0	Mnd	Int	Int	Mnd	
212	T3	Rd	Yes	0.30	20.0	15.0	110.0	Mnd	Int	Mnd	Int	
213	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
152	T3	Df	Yes	0.70	35.0	35.0	1300.0	Int	Mnd	Mnd	Mnd	Elongated SW to NE
153	T3	Df	Yes	0.70	25.0	25.0	500.0	Mnd	Mnd	Int	Mnd	
154	T3	Df	Yes	0.55	30.0	30.0	480.0	Mnd	Int	Mnd	Mnd	Some mounds interconnected
155	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Possible drainage
156	T3	Df	Yes	0.30	14.0	10.0	140.0	Int	OutofMU	Mnd	OutofMU	Df/Rd boundary
158	T3	Df	Yes	0.45	20.0	25.0	280.0	Mnd	Int	Int	Mnd	
159	T3	Df	Yes	0.50	30.0	30.0	490.0	Mnd	Int	Mnd	Int	
160	T3	Df	Yes	0.40	20.0	30.0	350.0	Int	Int	Mnd	Mnd	
161	T3	Df	Yes	0.50	30.0	35.0	670.0	Sha	Int	Int	Int	
162	T3	Df	Yes	0.70	20.0	30.0	400.0	Mnd	Mnd	Int	Int	
163	T3	Df	Yes	0.70	35.0	35.0	755.0	Int	Int	Mnd	Mnd	
164	T3	Df	Yes	0.40	25.0	35.0	670.0	Mnd	Int	Int	Mnd	
165	T3	Df	Yes	0.80	35.0	30.0	667.0	Int	Dist	Dist	Mnd	Oilfield road near SW/NE Mound
166	T3	Df	Yes	0.50	30.0	30.0	485.0	Mnd	Int	Int	Int	
167	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
168	T3	Df	Yes	0.30	15.0	30.0	480.0	Dist	Int	Mnd	Mnd	Oilfield road
169	T3	Df	Yes	0.50	16.0	15.0	240.0	Mnd	Mnd	Int	Mnd	
170	T3	Df	Yes	0.50	15.0	15.0	175.0	Sha	Sha	Int	Dist	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
171	T3	Df	Yes	0.30	12.0	12.0	140.0	Int	Sha	Int	Sha	
172	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
173	T3	Df	Yes	0.50	25.0	25.0	340.0	Int	Sha	Int	Mnd	
174	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
175	T3	Df	Yes	0.60	30.0	20.0	380.0	Int	Int	Int	Mnd	
176	T3	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
177	T3	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
178	T3	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
179	T3	Df	Yes	0.70	20.0	25.0	260.0	Int	Int	Int	Int	
180	T3	Df	Yes	0.70	25.0	30.0	505.0	Mnd	Mnd	Int	Int	
181	T3	Df	Yes	0.70	22.0	25.0	325.0	Int	Mnd	Int	Int	
214	T3	Rd	Yes	0.50	22.0	20.0	150.0	Int	Mnd	OutofMU	Int	
215	T3	Rd	Yes	0.35	20.0	20.0	205.0	Int	Mnd	Mnd	Mnd	
216	T3	Rd	Yes	0.35	24.0	30.0	295.0	Mnd	Mnd	Mnd	Int	
217	T3	Rd	Yes	0.50	30.0	30.0	425.0	Dist	Int	Int	Mnd	Private Road
218	T3	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
219	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
220	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	OutofMU	
221	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	
222	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
223	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
224	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
225	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	Drainage ditch/old road?
226	T3	Rd	No	0.00	0.0	0.0	0.0	Wat	Dist	Wat	Dist	Stocktank
227	T3	Rd	Yes	0.40	25.0	25.0	350.0	Int	Mnd	Int	Int	
228	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
229	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
230	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
231	T3	Rd	Yes	0.70	30.0	30.0	780.0	Mnd	Mnd	Mnd	OutofMU	SW-NE Mound
232	T3	Rd	Yes	0.50	35.0	25.0	798.0	Mnd	Int	Int	Dist	Oilfield road
233	T3	Rd	Yes	0.30	14.0	14.0	152.0	Int	Int	Int	Int	
234	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
235	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	Oilfield Pad
236	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	OutofMU	OutofMU	Oilfield Pad
237	T3	Rd	Yes	0.50	16.0	12.0	130.0	Int	Int	Int	Int	
238	T3	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
239	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
240	T3	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Sha	Int	
241	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Sha	Int	20cm mound excluded
242	T3	Rd	Yes	1.00	16.0	12.0	135.0	Mnd	Int	Int	Int	
243	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
244	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Dist	Dist	Possible old road

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
245	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
246	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Dist	Int	old roadbed?
247	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Dist	Dist	Old roadbed?
248	T3	Rd	Yes	0.40	22.0	25.0	380.0	Int	Int	Mnd	Mnd	
249	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Dist	Int	Old roadbed?
250	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	Oldfield road possible mounds
251	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
252	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	OutofMU	Int	Int	Old roadbed?
253	T3	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Dist	Dist	Int	Old roadbed?
254	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
255	T3	Rd	Yes	0.70	20.0	22.0	247.0	Int	Int	Mnd	Int	
256	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
257	T3	Rd	Yes	0.40	18.0	16.0	180.0	Mnd	Int	Int	Int	
258	T3	Rd	Yes	0.30	18.0	12.0	120.0	Int	Int	Int	Int	
259	T3	Rd	Yes	0.55	24.0	25.0	400.0	OutofMU	Int	Int	Int	
260	T3	Rd	Yes	0.30	10.0	15.0	145.0	Sha	Dist	Dist	Int	Old Road?
261	T3	Rd	Yes	0.90	30.0	30.0	595.0	Mnd	Int	Dist	Int	
262	T3	Rd	Yes	0.80	35.0	35.0	1050.0	Int	Sha	Dist	Mnd	Old Road?
264	T3	Rd	Yes	0.30	15.0	10.0	172.0	Mnd	Int	Int	Int	
265	T3	Rd	Yes	0.45	20.0	20.0	336.0	Mnd	OutofMU	Int	OutofMU	
266	T3	Rd	Yes	0.40	18.0	20.0	155.0	Mnd	Int	Dist	Int	Private Road
267	T3	Rd	Yes	0.30	25.0	20.0	340.0	Sha	Sha	Int	Mnd	
268	T3	Rd	Yes	0.40	15.0	18.0	154.0	Int	Int	Mnd	Int	
269	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Wat	Wat	
270	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Oilfield Road
271	T3	Rd	Yes	0.30	20.0	18.0	260.0	Int	Int	Dist	Dist	Katie Road
272	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Oilfield pad.
274	T3	Rd	Yes	0.45	22.0	20.0	275.0	Mnd	Int	Int	Int	
275	T3	Rd	Yes	0.70	22.0	20.0	336.0	Int	Int	Int	Mnd	
276	T3	Rd	Yes	0.50	22.0	25.0	353.0	Mnd	Mnd	Mnd	Mnd	
277	T3	Rd	Yes	0.60	20.0	20.0	260.0	Sha	Int	Sha	Int	
278	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
279	T3	Rd	Yes	0.60	20.0	24.0	340.0	Mnd	OutofMU	Mnd	Mnd	
280	T3	Rd	Yes	0.40	20.0	22.0	285.0	Mnd	Mnd	Mnd	Int	
281	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	
282	T3	Rd	Yes	0.40	20.0	18.0	255.0	Int	Mnd	OutofMU	Int	
283	T3	Rd	Yes	0.40	20.0	24.0	365.0	Int	Int	Int	Mnd	
284	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Dist	Int	Int	Stock tank dam.
285	T3	Rd	Yes	1.00	25.0	30.0	535.0	Int	Mnd	Int	Mnd	
286	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	
287	T3	Rd	Yes	0.55	20.0	25.0	355.0	Int	Int	Int	Mnd	
288	T3	Rd	Yes	0.50	24.0	25.0	536.0	Int	Mnd	OutofMU	Int	Two mounds joined SW to NE.

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
289	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	OutofMU	Old road or fence line.
290	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Dist	Oil field road
291	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
292	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Abandoned oil field pad?
293	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	Pipeline trench cut scar.
294	T3	Rd	Yes	0.40	16.0	20.0	260.0	Int	Mnd	Int	Int	
295	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	Oil field road/private road
296	T3	Rd	Yes	0.45	14.0	14.0	178.0	Int	Int	Int	Mnd	
297	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	OutofMU	Int	
298	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Int	
299	T3	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
300	T3	Rd	Yes	0.45	24.0	20.0	455.0	Int	Mnd	Int	Int	
301	T3	Rd	Yes	0.40	14.0	20.0	350.0	Int	Int	Int	Int	Mound extends SW to NE
302	T3	Rd	Yes	0.30	25.0	22.0	375.0	Mnd	Int	Mnd	Int	
303	T3	Rd	Yes	0.50	20.0	25.0	472.0	Int	Int	Sha	Sha	Mound elongated from SW to NE
304	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
305	T3	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	Along terrace rise.
306	T3	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Int	Oth	Along terrace rise/cut channel
910	T4	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Wat	Stock tank and dam.
911	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
912	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
913	T4	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
914	T4	Df	Yes	0.70	24.0	25.0	467.0	Int	Mnd	Int	Int	
915	T4	Df	Yes	0.47	22.0	26.0	442.0	Int	Int	Int	Int	
916	T4	Df	Yes	0.47	24.0	22.0	459.0	Int	Mnd	Int	Int	
917	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
918	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
919	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	.25m mound at nick point
920	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
921	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
922	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
923	T4	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
924	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
925	T4	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	Fence row
926	T4	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
927	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
928	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
929	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
930	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
931	T4	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	Remnant ridge or mound
932	T4	Df	No	0.00	0.0	0.0	0.0	Oth	Int	Int	Int	Nick point
933	T4	Df	Yes	0.85	25.0	24.0	438.0	Mnd	Mnd	Oth	Oth	Mound at nick point

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
934	T4	Df	Yes	0.74	29.0	30.0	515.0	Int	Mnd	Oth	Mnd	Mounds at nick point
935	T4	Df	Yes	1.20	28.0	32.0	525.0	Int	Int	Int	Int	Forested
936	T4	Df	Yes	0.80	38.0	32.0	712.0	Int	Mnd	OutofMU	OutofMU	Mound oblong to SE
937	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	Int	Fencerow
938	T4	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	nick point
939	T4	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	nick point
940	T4	Df	Yes	0.66	36.0	37.0	889.0	Oth	Oth	Mnd	Mnd	Mounds near nick point
941	T4	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
942	T4	Df	Yes	0.95	51.0	52.0	1831.0	Int	MRdg	Mnd	Int	
943	T4	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
944	T4	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	Nick point and low intermound
945	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
946	T4	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	Int	Int	Low intermound depression
947	T4	Df	Yes	0.95	32.0	40.0	928.0	Mnd	Mnd	MRdg	MRdg	
948	T4	Df	Yes	0.34	28.0	30.0	641.0	Int	Int	Int	MRdg	
949	T4	Df	Yes	0.81	26.0	28.0	575.0	MRdg	Int	Int	Int	
950	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Ridge?
951	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
952	T4	Df	Yes	0.36	15.0	15.0	116.0	Int	Int	Int	Int	
953	T4	Df	Yes	0.80	30.0	35.0	650.0	Int	Mnd	Mnd	Int	
954	T4	Df	Yes	1.15	55.0	36.0	1918.0	Mnd	Mnd	Int	Mnd	Oblong mound/Ridge?
985	T4	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	MRdg	Int	
986	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
987	T4	Rd	Yes	0.85	35.0	41.0	796.0	Mnd	Mnd	Mnd	Int	
988	T4	Rd	Yes	0.44	24.0	17.0	141.0	Int	Int	Int	Int	
989	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Oth	Int	Nick point
990	T4	Rd	Yes	2.20	51.0	46.0	1897.0	Int	Dist	Mnd	Dist	Mound adjacent to road
991	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	OutofMU	OutofMU	
992	T4	Rd	Yes	1.13	27.0	32.0	545.0	Mnd	Int	Int	Int	
993	T4	Rd	Yes	0.69	27.0	28.0	382.0	Mnd	Int	Int	Int	Eroded slope
994	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	FM Road
995	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	FM Road
996	T4	Rd	Yes	0.64	30.0	50.0	950.0	Mnd	Int	Int	Int	
997	T4	Rd	Yes	0.34	23.0	24.0	385.0	Int	Int	Mnd	Int	
998	T4	Rd	Yes	0.52	28.0	28.0	447.0	Mnd	Int	Int	Mnd	
1001	T4	Rd	Yes	0.95	38.0	52.0	1312.0	Mnd	Int	Mnd	Int	
1002	T4	Rd	Yes	0.68	25.0	28.0	408.0	Int	Int	Int	Int	
1003	T4	Rd	Yes	0.90	26.0	40.0	720.0	Mnd	Int	Int	Int	
1004	T4	Rd	Yes	0.56	22.0	20.0	348.0	Int	Mnd	OutofMU	Int	
1005	T4	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
1006	T4	Rd	Yes	0.72	28.0	49.0	885.0	Int	Int	Int	Mnd	
1007	T4	Rd	Yes	0.70	35.0	31.0	599.0	Mnd	Mnd	OutofMU	OutofMU	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1008	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1009	T4	Rd	Yes	1.25	40.0	24.0	636.0	Int	Mnd	Mnd	Mnd	
1010	T4	Rd	Yes	0.95	28.0	38.0	559.0	Mnd	Int	Int	Mnd	
1011	T4	Rd	Yes	0.90	32.0	32.0	786.0	Mnd	Mnd	Mnd	Mnd	
1012	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	Nick point
1013	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Oth	Int	Int	Nick point
1014	T4	Rd	Yes	1.08	26.0	46.0	770.0	Int	Mnd	Int	Int	
1015	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1016	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1017	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1018	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1019	T4	Rd	Yes	0.58	16.0	17.0	168.0	Int	Int	Int	Int	
1020	T4	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1021	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1022	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Int	OutofMU	Int	Nick point
1023	T4	Rd	Yes	0.58	28.0	32.0	580.0	Int	Mnd	Int	Int	
1024	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	OutofMU	OutofMU	
1025	T4	Rd	Yes	0.55	34.0	34.0	786.0	Int	Int	Mnd	Mnd	Mound at nick point
1026	T4	Rd	Yes	0.66	36.0	48.0	1060.0	Mnd	Int	Mnd	Int	
1027	T4	Rd	Yes	0.56	27.0	30.0	525.0	Int	Int	Int	Int	
1028	T4	Rd	Yes	0.60	32.0	30.0	560.0	Int	Mnd	Dist	Wat	Stock tank
1029	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1030	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1031	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1032	T4	Rd	Yes	0.66	34.0	26.0	361.0	Int	Oth	Mnd	Int	Nick point
1033	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1034	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1035	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1036	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Nick point
1037	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Nick point
1038	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	Wagon road?
1039	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1040	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Dist	Oth	Sha	FM road and nick point
1041	T4	Rd	Yes	0.95	26.0	29.0	350.0	Int	Int	Mnd	Int	
1042	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1043	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	Tank dam
1044	T4	Rd	Yes	0.85	42.0	35.0	989.0	Int	Mnd	Int	Int	
1045	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1046	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Pipeline? Right of way
1047	T4	Rd	Yes	0.80	23.0	27.0	529.0	Mnd	Int	Mnd	Mnd	
1048	T4	Rd	Yes	0.38	28.0	28.0	408.0	Int	Int	Mnd	Int	
955	T4	Df	Yes	0.68	28.0	31.0	484.0	Int	Int	Mnd	Mnd	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
956	T4	Df	Yes	0.70	30.0	30.0	392.0	Int	Int	Int	Int	
957	T4	Df	Yes	0.95	35.0	21.0	457.0	Int	Mnd	Int	Int	
958	T4	Df	Yes	0.78	23.0	25.0	336.0	Int	Mnd	Int	Int	
959	T4	Df	Yes	0.72	32.0	25.0	643.0	Mnd	Mnd	Int	Mnd	
960	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	Nick point
961	T4	Df	Yes	0.80	24.0	28.0	547.0	Int	Int	OutofMU	OutofMU	Mound at nick point
962	T4	Rd	Yes	1.10	27.0	32.0	633.0	Int	Int	Mnd	Int	
963	T4	Rd	Yes	1.05	35.0	38.0	900.0	Mnd	Mnd	Mnd	Mnd	
964	T4	Rd	Yes	0.86	36.0	34.0	575.0	Int	Int	MRdg	Int	
965	T4	Rd	Yes	1.10	31.0	36.0	975.0	Int	OutofMU	Mnd	OutofMU	Mound extends to SE
966	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Likely mapped incorrectly.
967	T4	Rd	Yes	0.62	25.0	30.0	605.0	Mnd	Int	Mnd	Mnd	
968	T4	Rd	Yes	0.87	27.0	28.0	633.0	Mnd	Int	Int	Mnd	
969	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Mnd	Mnd	Ashford?
970	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Ashford?
971	T4	Rd	Yes	0.48	26.0	21.0	285.0	Int	Int	Int	Int	Ashford similar?
972	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	OutofMU	Oth	Steep slope residuum?
973	T4	Rd	Yes	0.84	33.0	32.0	379.0	Int	Int	Int	Int	
974	T4	Rd	Yes	0.74	29.0	35.0	566.0	Mnd	Mnd	Int	Mnd	
975	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
976	T4	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
977	T4	Rd	Yes	1.15	41.0	43.0	938.6	Int	Mnd	Mnd	Mnd	
978	T4	Rd	Yes	0.90	30.0	34.0	538.0	Mnd	Mnd	Int	Int	
979	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Low intermound depression
980	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Low intermound depression
981	T4	Rd	Yes	0.54	30.0	20.0	495.0	Int	OutofMU	Int	OutofMU	Mound at nick point
982	T4	Rd	Yes	0.64	24.0	28.0	422.0	Mnd	Sha	OutofMU	OutofMU	Mound at nick point
983	T4	Rd	Yes	0.56	28.0	30.0	503.0	Mnd	Mnd	Mnd	Mnd	
984	T4	Rd	Yes	0.64	25.0	26.0	465.0	Mnd	Mnd	Mnd	Mnd	
1049	T4	Rd	Yes	0.32	25.0	22.0	337.0	Int	Sha	Int	Mnd	
1050	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1051	T4	Rd	Yes	0.58	35.0	38.0	752.0	Int	Mnd	Mnd	Mnd	
1052	T4	Rd	Yes	0.85	28.0	27.0	513.0	Mnd	Int	Mnd	Mnd	
1053	T4	Rd	Yes	0.60	20.0	23.0	350.0	Int	Mnd	Mnd	Int	
1054	T4	Rd	Yes	1.50	33.0	46.0	1250.0	Int	Int	Mnd	Mnd	
1055	T4	Rd	Yes	0.75	34.0	26.0	0.0	Int	OutofMU	Mnd	OutofMU	
1056	T4	Rd	Yes	1.15	21.0	34.0	575.0	Int	Mnd	Int	Int	
1058	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1059	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1060	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1061	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1062	T4	Rd	Yes	0.37	19.0	21.0	173.0	Int	Int	OutofMU	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1063	T4	Rd	Yes	0.44	24.0	26.0	523.0	Int	Int	Int	Mnd	
1064	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1065	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1066	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1067	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	
1068	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1069	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1070	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1071	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1072	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Colluvium?
1073	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Wat	Int	Stock tank
1074	T4	Rd	Yes	0.88	27.0	36.0	657.0	Mnd	Mnd	Dist	Dist	Stock tank
1075	T4	Rd	Yes	0.85	30.0	22.0	635.0	Int	Oth	Int	Oth	Mound at nick point
1076	T4	Rd	No	0.00	0.0	0.0	0.0	Sha	Oth	Oth	Oth	Nick point
1077	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1078	T4	Rd	Yes	0.80	31.0	40.0	602.0	Int	Int	Int	Mnd	
1079	T4	Rd	Yes	0.64	21.0	26.0	379.0	Int	Int	Int	Int	
1080	T4	Rd	Yes	0.66	36.0	27.0	741.0	Int	Mnd	Int	Mnd	Mound extends SE
1081	T4	Rd	Yes	0.58	27.0	30.0	302.0	Int	Mnd	Int	Int	
1082	T4	Rd	Yes	0.62	28.0	21.0	266.0	Int	Dist	Mnd	Wat	Stock tank
1083	T4	Rd	Yes	1.08	29.0	32.0	282.0	Int	Int	Int	Mnd	
1084	T4	Rd	Yes	0.60	25.0	25.0	230.0	Int	Int	Int	Mnd	
1085	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1086	T4	Rd	Yes	0.65	26.0	30.0	505.0	Mnd	Int	Int	Int	Mound extends NE
1087	T4	Rd	Yes	0.58	31.0	28.0	302.0	Int	Int	Int	MRdg	Elliptical mound or ridge
1088	T4	Rd	Yes	0.59	28.0	32.0	560.0	Int	Int	Int	Int	
1089	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1090	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1091	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1092	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1093	T4	Rd	Yes	0.62	32.0	24.0	610.0	Int	Int	Int	Int	
1094	T4	Rd	Yes	0.91	30.0	28.0	400.0	Int	Mnd	Mnd	Mnd	
1095	T4	Rd	Yes	0.80	25.0	24.0	357.0	Int	Mnd	Mnd	Mnd	
1096	T4	Rd	Yes	0.52	21.0	18.0	168.0	Mnd	Int	Mnd	Mnd	
1097	T4	Rd	Yes	0.80	30.0	27.0	353.0	Int	Mnd	Int	Int	
1098	T4	Rd	Yes	0.80	28.0	30.0	391.0	Mnd	Int	Int	Int	
1099	T4	Rd	Yes	0.76	30.0	32.0	449.0	Int	Mnd	Mnd	Mnd	
1100	T4	Rd	Yes	0.80	30.0	31.0	405.0	Mnd	Mnd	Int	Int	
1101	T4	Rd	Yes	0.85	29.0	27.0	638.0	Mnd	Int	Int	Dist	Oil field road
1102	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	Material from oil pad
1103	T4	Rd	Yes	0.73	30.0	28.0	255.0	Int	Int	Int	Mnd	
1104	T4	Rd	Yes	0.32	18.0	15.0	50.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1105	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1106	T4	Rd	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	Int	
1107	T4	Rd	Yes	0.60	36.0	33.0	692.0	Mnd	Mnd	Int	Int	
1108	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	
1109	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1110	T4	Rd	Yes	0.64	22.0	21.0	272.0	Mnd	Int	Int	Int	
1113	T4	Rd	Yes	0.66	22.0	23.0	345.0	Mnd	Mnd	Mnd	Int	
1114	T4	Rd	Yes	0.56	22.0	26.0	250.0	Int	Mnd	Int	Int	
1115	T4	Rd	Yes	0.54	24.0	20.0	262.0	Mnd	OutofMU	Int	OutofMU	
1116	T4	Rd	Yes	1.02	27.0	20.0	313.0	Mnd	Int	Int	Int	Gully adjacent to mound
1117	T4	Rd	Yes	0.64	31.0	31.0	570.0	Mnd	Int	Mnd	Int	
1118	T4	Rd	Yes	0.64	36.0	28.0	579.0	Int	Int	Mnd	Mnd	
1119	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1120	T4	Rd	Yes	0.47	28.0	22.0	260.0	Int	Int	Int	Mnd	
1121	T4	Rd	Yes	0.42	22.0	22.0	277.0	Int	Mnd	Int	Int	
1122	T4	Rd	Yes	0.45	26.0	22.0	276.0	Int	Int	Int	Int	
1123	T4	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1124	T4	Df	Yes	0.46	41.0	32.0	738.0	Int	Int	Int	Mnd	
1125	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1126	T4	Rd	Yes	0.70	14.0	19.0	232.0	Int	Int	Int	Mnd	
1127	T4	Rd	Yes	0.40	22.0	17.0	129.0	Int	Mnd	Int	Mnd	
1128	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Oth	Oth	Nick point/stock tank
1129	T4	Rd	Yes	0.68	26.0	30.0	267.0	Mnd	Int	Int	Mnd	
1130	T4	Rd	Yes	0.50	14.0	17.0	107.0	Int	Mnd	Int	Int	
1131	T4	Rd	Yes	0.42	19.0	24.0	208.0	Sha	Sha	Int	Int	
1132	T4	Rd	Yes	0.66	28.0	24.0	274.0	Int	Int	Int	Mnd	
1133	T4	Rd	Yes	0.40	36.0	39.0	1035.0	Int	Int	Mnd	Mnd	
1134	T4	Rd	Yes	0.60	20.0	23.0	277.0	Mnd	Dist	Mnd	Int	Structure
1135	T4	Rd	Yes	0.63	24.0	25.0	363.0	Mnd	Int	Mnd	Mnd	
1136	T4	Rd	Yes	0.34	17.0	14.0	190.0	Int	Int	Int	Int	
1137	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1138	T4	Rd	Yes	0.56	28.0	25.0	445.0	Int	Int	Oth	Mnd	Mound at nickpoint
1139	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1140	T4	Rd	Yes	0.56	28.0	33.0	500.0	Mnd	Int	Int	Int	
1141	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1142	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1143	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1144	T4	Rd	No	0.00	0.0	0.0	0.0	Oth	Int	Oth	Int	Nick point
1145	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1146	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Wat	Dist	Dist	Stock tank and dam
1147	T4	Rd	Yes	0.60	34.0	32.0	654.0	Mnd	Int	Mnd	Int	
1148	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1149	T4	Rd	Yes	0.60	19.0	26.0	230.0	Mnd	Int	Int	Int	
1150	T4	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
1151	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mounds on slope?
1152	T4	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1153	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1154	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1155	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1156	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1157	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1158	T4	Rd	Yes	0.90	50.0	60.0	1625.0	Int	Int	Mnd	Mnd	
1159	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1160	T4	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1161	T4	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1162	T4	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	OutofMU	Int	
1163	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1164	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1165	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1166	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1167	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1168	T4	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1169	T4	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1170	T4	Df	Yes	1.00	30.0	27.0	497.0	Int	Mnd	Int	Int	
1171	T4	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1172	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	MRdg	Int	Int	?
1173	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1174	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1175	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1176	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1177	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1178	T4	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1179	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	Private road
1180	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1181	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1182	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1183	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1184	T4	Rd	Yes	0.60	26.0	28.0	420.0	Int	OutofMU	OutofMU	OutofMU	
1185	T4	Rd	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	
1186	T4	Rd	Yes	0.70	44.0	44.0	683.0	OutofMU	Int	Int	Mnd	
1187	T4	Rd	Yes	0.50	22.0	11.0	149.0	OutofMU	Mnd	OutofMU	Int	
1188	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1189	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1190	T4	Rd	Yes	1.10	33.0	22.0	369.0	Mnd	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1191	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1192	T4	Rd	Yes	1.20	42.0	52.0	1330.0	Int	Mnd	OutofMU	Int	
1193	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1194	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1195	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1196	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1197	T4	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	Old stock tank dam
1198	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1199	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1200	T4	Rd	Yes	0.80	32.0	38.0	745.0	Int	OutofMU	Mnd	Mnd	
1201	T4	Rd	Yes	0.75	34.0	36.0	694.0	Mnd	Int	Oth	Oth	Nick point
1202	T4	Rd	Yes	0.95	34.0	34.0	741.0	Mnd	Int	Int	Int	
1203	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1204	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1205	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1206	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1207	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1208	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1209	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	MRdg	OutofMU	
1210	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1211	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1212	T4	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1213	T4	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1214	T4	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1215	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	Nick point
1216	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1217	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1218	T5	Rd	No	0.00	0.0	0.0	0.0	Sha	Oth	Sha	Oth	Nick point
1219	T5	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1220	T5	Rd	No	0.00	0.0	0.0	0.0	Sha	MRdg	Sha	Int	
1221	T5	Rd	Yes	0.43	36.0	22.0	715.0	Int	Mnd	Int	Int	
1222	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Wat	Int	Dist	Stock tank and dam
1223	T5	Rd	Yes	0.58	26.0	27.0	523.0	Oth	Int	Oth	Int	Mound at nick point
1224	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Oth	Gully
1225	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1226	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1227	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1228	T5	Rd	Yes	0.44	34.0	38.0	720.0	Int	Int	Int	Mnd	
1229	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1230	T5	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Int	OutofMU	
1231	T5	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1232	T5	Rd	Yes	0.75	26.0	25.0	363.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1233	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1234	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	
1235	T5	Rd	Yes	0.70	29.0	40.0	990.0	Sha	Sha	Int	Mnd	
1236	T5	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1237	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Int	Oth	Int	Nick point
1238	T5	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1239	T5	Rd	No	0.00	0.0	0.0	0.0	Sha	Oth	Sha	Int	
1240	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	
1241	T5	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1242	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1243	T5	Rd	Yes	0.48	29.0	24.0	303.0	Int	Mnd	Int	Mnd	
1395	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1396	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1397	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1398	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1399	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1400	T5	Df	Yes	0.35	33.0	28.0	430.0	Int	Mnd	Int	Int	
1401	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1402	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope?
1403	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	OutofMU	Int	
1404	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope?
1405	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1406	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	CR
1407	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Int	Oth	Int	Gully
1408	T5	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1409	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1410	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1411	T5	Df	Yes	0.38	29.0	38.0	775.0	Int	Int	Int	Mnd	
1412	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1413	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1414	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1415	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1416	T5	Df	No	0.00	0.0	0.0	0.0	MRdg	Sha	Int	Int	
1417	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Dist	OutofMU	Road cut
1418	T5	Df	Yes	0.54	28.0	25.0	598.0	Dist	Int	Int	Int	PR
1419	T5	Df	Yes	0.75	46.0	46.0	854.0	Int	Mnd	Int	Mnd	Extends to NE
1420	T5	Df	Yes	0.40	24.0	26.0	225.0	Int	Int	Int	Dist	PR
1421	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	0.15m Mound excluded
1422	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1423	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
1424	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1425	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1426	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	0.15m Mound excluded
1427	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1334	T5	Df	Yes	0.62	34.0	26.0	712.0	Int	Mnd	Int	Int	
1335	T5	Df	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Int	Int	
1336	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1337	T5	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Sha	
1338	T5	Df	Yes	0.30	22.0	22.0	265.0	Int	Mnd	Int	Int	
1339	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded .23m
1340	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	Stock tank dam
1341	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Oth	Oth	Nick point
1342	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Oth	Mound excluded/nick point
1343	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	OutofMU	
1344	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mounds excluded <.3m
1345	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1346	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1347	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1348	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Int	OutofMU	OutofMU	
1349	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1350	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1351	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1352	T5	Df	Yes	0.42	24.0	30.0	488.0	Sha	Sha	Int	Int	
1353	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1354	T5	Df	Yes	0.42	40.0	34.0	428.0	Mnd	Int	Int	Int	
1355	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1356	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1357	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1358	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Int	OutofMU	Int	Private road
1359	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1360	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1361	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1362	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1363	T5	Rd	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	Int	
1364	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1365	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1366	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1367	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Mnd	Int	
1244	T5	Rd	Yes	0.58	30.0	34.0	640.0	Sha	Sha	Int	Int	
1245	T5	Rd	Yes	0.77	42.0	39.0	1330.0	Sha	Int	Sha	Mnd	
1246	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	Drainage ditch
1247	T5	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	Private road
1248	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1249	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Oth	Int	Int	Nick point

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1250	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1251	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1252	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	OutofMU	Oth	OutofMU	Nick point
1253	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Wat	Dist	Stock tank at nick point
1254	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Wat	Stock tank at nick point
1255	T5	Rd	Yes	0.72	45.0	48.0	1509.0	Mnd	Int	Int	Oth	Mound near nick point
1256	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1257	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1258	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1259	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1260	T5	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	
1261	T5	Rd	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	MRdg	
1262	T5	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Colluvium?
1263	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1264	T5	Rd	Yes	0.70	44.0	27.0	593.0	Int	Int	Mnd	Mnd	
1265	T5	Rd	Yes	0.80	38.0	40.0	885.0	Int	Mnd	Int	Mnd	
1266	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Dist	Dist	Homesite
1267	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Dist	
1268	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Dist	Int	Farm Road Intersection
1269	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Dist	Int	
1270	T5	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1271	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Oth	Mound disturbed by FM road
1272	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Int	
1273	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1274	T5	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Wat	Int	
1275	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
1276	T5	Df	No	0.00	0.0	0.0	0.0	Dist	OutofMU	Dist	OutofMU	Oil field
1277	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1368	T5	Df	Yes	0.81	44.0	48.0	1122.0	Mnd	Oth	Int	Int	Mound at nick point
1369	T5	Df	Yes	0.56	45.0	42.0	935.0	Int	Mnd	Int	Int	
1370	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1371	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1372	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	Nick point
1373	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1374	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	OutofMU	OutofMU	Nick point
1375	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	OutofMU	OutofMU	
1376	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Sha	Oth	OutofMU	Nick point
1377	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	OutofMU	OutofMU	
1378	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	
1379	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Nick point
1380	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1381	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	OutofMU	OutofMU	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1382	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Wat	Oth	Nick point
1383	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1384	T5	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	Meander ridge dissected by PR
1385	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1386	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Dist	PR
1387	T5	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	PR
1388	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1389	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1390	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Oth	Int	Steep slope
1391	T5	Df	Yes	0.46	32.0	35.0	1035.0	Int	Int	Int	Mnd	
1392	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1393	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1394	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1428	T5	Df	Yes	0.42	34.0	28.0	447.0	Mnd	Int	Int	Int	
1429	T5	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	MRdg	Int	
1430	T5	Df	Yes	0.40	24.0	25.0	182.0	Int	Mnd	Int	Int	
1431	T5	Df	Yes	0.40	26.0	21.0	170.0	Int	Sha	Int	Sha	
1432	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1433	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1434	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1435	T5	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	Int	Int	
1436	T5	Df	Yes	0.40	24.0	26.0	250.0	Int	Int	Int	Int	
1437	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1438	T5	Df	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1439	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1440	T5	Df	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1441	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1442	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mounds on slope exclude
1443	T5	Df	Yes	0.33	26.0	28.0	382.0	Mnd	Mnd	Int	Int	
1444	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope
1445	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
1446	T5	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	Mound excluded 0.25m
1447	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1448	T5	Df	Yes	0.42	28.0	24.0	514.0	Mnd	Int	OutofMU	OutofMU	
1449	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
1450	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
1451	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1452	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1453	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1454	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
1455	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
1456	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1457	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1458	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1459	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	Sha	Int	Sha	
1278	T5	Df	Yes	0.46	28.0	32.0	384.0	Dist	Dist	Int	Mnd	FM road
1279	T5	Df	Yes	0.50	38.0	38.0	871.0	Int	Int	Mnd	Mnd	
1280	T5	Df	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1281	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1282	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1283	T5	Df	Yes	0.70	50.0	42.0	966.0	Int	Int	Int	Int	
1284	T5	Df	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
1285	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1286	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1287	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1288	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1289	T5	Df	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	
1290	T5	Df	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1291	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1292	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1293	T5	Df	Yes	0.90	32.0	29.0	475.0	Int	Mnd	Int	Mnd	
1294	T5	Df	Yes	0.80	32.0	34.0	603.0	Int	Int	Mnd	Int	
1295	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1296	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1297	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Sha	
1298	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1299	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1300	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1301	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1302	T5	Df	Yes	0.68	22.0	18.0	284.0	Mnd	Sha	Mnd	Int	
1303	T5	Df	Yes	0.95	40.0	50.0	1229.0	Int	Int	Mnd	Sha	
1304	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1305	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1306	T5	Df	Yes	0.80	31.0	34.0	497.0	Int	Mnd	Int	Int	
1307	T5	Df	Yes	0.70	34.0	32.0	700.0	Mnd	Int	Sha	Int	
1308	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1309	T5	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1310	T5	Rd	No	0.00	0.0	0.0	0.0	Dist	OutofMU	Int	OutofMU	Stock tank dam
1311	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1312	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1313	T5	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1314	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.27m
1315	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1316	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded eroded on slope

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1317	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	2 mounds excluded .25m & .2m
1318	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1319	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1320	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1321	T5	Df	Yes	0.31	22.0	24.0	386.0	Int	Int	Int	Int	
1322	T5	Df	Yes	0.37	34.0	35.0	633.0	Int	Int	Mnd	Int	
1323	T5	Df	Yes	0.42	34.0	38.0	668.0	Sha	Int	Mnd	Int	
1324	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1325	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1326	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1327	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1328	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1329	T5	Df	Yes	0.42	34.0	24.0	338.0	Mnd	Mnd	Int	Int	
1330	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1331	T5	Df	Yes	0.36	23.0	23.0	231.0	Int	Int	Int	Int	
1332	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1333	T5	Df	Yes	0.44	38.0	29.0	422.0	Sha	Int	Sha	Int	
1460	T5	Df	Yes	0.36	24.0	24.0	218.0	Int	Int	Int	Int	
1461	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Oth	Oth	Drainage
1462	T5	Df	No	0.00	0.0	0.0	0.0	Wat	Oth	Oth	Oth	Eroded drainageway
1463	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1464	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound excluded on slope
1465	T5	Df	Yes	0.58	24.0	23.0	388.0	Int	Int	Int	Int	
1466	T5	Df	Yes	0.58	10.0	21.0	180.0	Sha	Sha	Int	Int	
1467	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Sha	Int	Int	
1468	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	
1469	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1470	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1471	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1472	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1473	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1474	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1475	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1476	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1477	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1478	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1479	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1480	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1481	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1482	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1483	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1484	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1485	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1486	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1487	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1488	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1489	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1490	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1491	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1492	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1493	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1494	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1495	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1496	T5	Df	Yes	0.46	20.0	26.0	215.0	Sha	Int	Sha	Int	
1497	T5	Df	Yes	0.32	20.0	20.0	150.0	Int	Int	Mnd	Int	
1498	T5	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1499	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1500	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1501	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1502	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1503	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1504	T5	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1505	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m
1506	T5	Df	Yes	0.48	32.0	30.0	550.0	Int	Int	Int	Mnd	
1507	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1508	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1509	T5	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1510	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1511	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1512	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1513	T5	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1514	T5	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope
1554	Up	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1555	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1556	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1557	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Sha	Int	
1558	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1559	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1560	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Int	Int	
1561	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1562	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1563	Up	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1564	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1565	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1566	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	OutofMU	
1567	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1568	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope excluded
1569	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1570	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1571	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1572	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	Eroded mound on slope excluded
1573	Up	Rd	Yes	0.76	40.0	42.0	595.0	Sha	Int	Int	Mnd	
1574	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1575	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	MRdg	MRdg	Eroded meander ridge on slope.
1576	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1577	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1578	Up	Rd	No	0.00	0.0	0.0	0.0	MRdg	MRdg	MRdg	MRdg	Eroded meander ridge on slope
1579	Up	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	Int	Int	
1580	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	CR
1581	Up	Rd	No	0.00	0.0	0.0	0.0	Dist	Sha	Int	Int	
1582	Up	Rd	Yes	0.76	36.0	39.0	487.0	Int	Int	Int	Dist	CR
1583	Up	Rd	Yes	0.41	34.0	42.0	927.0	Int	Sha	Dist	Mnd	
1584	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1585	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1586	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1587	Up	Df	Yes	0.37	20.0	20.0	440.0	Int	OutofMU	OutofMU	OutofMU	Mound outside of delineation
1588	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1589	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	FM
1590	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	Mound excluded 0.15m
1591	Up	Df	Yes	0.31	22.0	20.0	193.0	Mnd	Sha	Int	Sha	
1592	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Dist	Dist	OutofMU	FM
1593	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1594	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1595	Up	Df	Yes	0.36	30.0	33.0	400.0	Int	Mnd	Int	Int	
1596	Up	Df	Yes	0.33	25.0	30.0	325.0	Int	Sha	Int	Sha	
1597	Up	Df	No	0.00	0.0	0.0	0.0	Wat	Sha	Wat	Sha	
1598	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Dist	OutofMU	FM
1599	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1600	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1601	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1602	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1603	Up	Df	Yes	0.38	19.0	15.0	132.0	Int	Mnd	Int	Int	
1604	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	Mound excluded 0.27m
1605	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1606	Up	Df	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	Int	
1607	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Mound excluded 0.25m

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1608	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1609	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1610	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Mnd	
1611	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1612	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1613	Up	Df	Yes	0.55	25.0	20.0	427.0	Int	Int	Int	Sha	
1646	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1647	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1648	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1649	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Sha	
1650	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	OutofMU	
1651	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1652	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1653	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1654	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1655	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1656	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1657	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1658	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1659	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1660	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1661	Up	Df	Yes	0.54	36.0	25.0	505.0	Int	Int	Int	Mnd	Eroded on slope
1662	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Drainage
1663	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1664	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1665	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope excluded
1666	Up	Df	Yes	0.48	27.0	26.0	316.0	Int	Int	Sha	Int	
1667	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1668	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1669	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1670	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1671	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Dist	Sha	Drainage
1672	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope excluded
1673	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1674	Up	Df	Yes	0.40	24.0	20.0	285.0	Int	Int	Mnd	Int	
1614	Up	Df	Yes	0.52	31.0	29.0	445.0	Int	Int	OutofMU	Mnd	
1615	Up	Df	No	0.00	0.0	0.0	0.0	Wat	Wat	Sha	Int	Stock tank
1616	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
1617	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	OutofMU	
1618	Up	Df	No	0.00	0.0	0.0	0.0	Dist	Sha	Int	Sha	PR
1619	Up	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Dist	PR and manmade terraces?
1620	Up	Df	No	0.00	0.0	0.0	0.0	Int	Oth	Int	Int	Manmade terraces?

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1621	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1622	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Dist	Sha	Dist	Gully
1623	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1624	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Sha	
1625	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Dist	Gully
1626	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1627	Up	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	PR
1628	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Dist	Sha	Int	Gully
1629	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mound on slope
1630	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Dist	Gully
1631	Up	Df	No	0.00	0.0	0.0	0.0	Dist	Dist	Int	Dist	Gullies
1632	Up	Df	No	0.00	0.0	0.0	0.0	Dist	OutofMU	Sha	OutofMU	Gully
1633	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	OutofMU	Int	
1634	Up	Df	Yes	0.58	38.0	29.0	485.0	Mnd	Mnd	Int	Int	
1635	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
1636	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	OutofMU	Sha	
1637	Up	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	
1638	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	Int	
1639	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1640	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1641	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1642	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1643	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1644	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	Mound on slope excluded .2m
1645	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	Mound excluded 0.25m
1751	Up	Df	Yes	0.58	28.0	26.0	421.0	Int	Mnd	Int	Int	
1675	Up	Df	Yes	0.42	18.0	20.0	120.0	Int	Int	Int	Int	
1676	Up	Df	Yes	0.44	20.0	25.0	215.0	Int	Sha	Int	Int	
1677	Up	Df	Yes	0.36	16.0	26.0	185.0	Int	Int	Int	Mnd	
1678	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1679	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1680	Up	Df	Yes	0.50	30.0	42.0	410.0	Mnd	Int	Int	Mnd	
1681	Up	Df	Yes	0.48	26.0	20.0	329.0	Int	Mnd	Mnd	Mnd	
1682	Up	Df	Yes	0.45	26.0	20.0	240.0	Int	Mnd	Int	Int	
1683	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1684	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1685	Up	Df	Yes	0.48	27.0	18.0	260.0	Mnd	Mnd	Int	OutofMU	
1686	Up	Df	Yes	0.34	12.0	16.0	130.0	Mnd	Int	Int	Int	
1687	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	Mound excluded 0.2m
1688	Up	Df	Yes	0.46	23.0	27.0	0.5	Int	Int	Int	Int	
1689	Up	Df	Yes	0.42	24.0	14.0	250.0	Int	Sha	Int	Int	
1690	Up	Df	Yes	0.50	26.0	27.0	233.0	Mnd	Sha	Int	Sha	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1691	Up	Df	Yes	0.39	27.0	26.0	265.0	Int	Sha	Int	Int	
1692	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	Eroded mounds on slope exclude
1693	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	Eroded mounds on slope exclude
1694	Up	Df	Yes	0.46	24.0	26.0	422.0	Int	Int	Int	Sha	
1695	Up	Df	Yes	0.44	26.0	22.0	339.0	OutofMU	Int	Int	Mnd	
1698	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1699	Up	Df	Yes	0.56	16.0	21.0	179.0	Sha	Mnd	Sha	Int	
1700	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1701	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	OutofMU	OutofMU	
1702	Up	Df	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Dist	Stock tank dam
1703	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Wat	Sha	OutofMU	Stock tank
1704	Up	Df	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
1705	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	Int	
1706	Up	Df	No	0.00	0.0	0.0	0.0	Oth	Int	Int	Sha	Drainage - gully
1707	Up	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	Drainage - gully
1708	Up	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Int	Drainage - gully
1709	Up	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Sha	Sha	
1710	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Oth	Sha	Oth	Drainage - gully
1515	Up	Rd	Yes	0.75	30.0	26.0	515.0	Mnd	Int	Int	Int	
1516	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Int	Int	Large mounds
1517	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Large mounds
1518	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Large mound
1519	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Oth	Oth	
1520	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Sha	Oth	Large mound
1521	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Sha	OutofMU	
1522	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Sha	Int	
1523	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Oth	Oth	Oth	Large mound
1524	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Oth	Oth	Large mound
1525	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Oth	Oth	Large mound
1526	Up	Rd	No	0.00	0.0	0.0	0.0	Dist	Int	OutofMU	Sha	Private road
1527	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Dist	Int	Int	
1528	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	MRdg	
1529	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1530	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Int	
1531	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1532	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope
1533	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope
1534	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Drainage
1535	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Oth	OutofMU	Drainage
1536	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Drainage
1537	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	OutofMU	OutofMU	OutofMU	Drainage
1538	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Oth	Oth	Oth	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1539	Up	Rd	Yes	0.46	30.0	26.0	496.0	Int	Int	Int	Mnd	
1540	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	MRdg	Sha	
1541	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1542	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1543	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1544	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Sha	Int	
1545	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	OutofMU	
1546	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Oth	OutofMU	Gully-drainage
1547	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	OutofMU	
1548	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1549	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1550	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Int	
1551	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Int	Oth	Int	Drainage
1552	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1553	Up	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	OutofMU	OutofMU	
1711	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1712	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1713	Up	Df	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope - gully
1714	Up	Df	No	0.00	0.0	0.0	0.0	Mnd	Int	Oth	Int	Steep slope - gully
1715	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1716	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1717	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1718	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1719	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1720	Up	Df	Yes	0.88	52.0	55.0	1943.0	Mnd	Mnd	Mnd	Mnd	
1721	Up	Df	Yes	1.00	67.0	36.0	1518.0	Int	Mnd	Int	Mnd	
1722	Up	Df	Yes	0.60	32.0	21.0	255.0	Int	Int	Sha	Sha	
1723	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1724	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1725	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1726	Up	Df	Yes	0.54	26.0	32.0	601.0	Oth	Int	Sha	Sha	Drainage - gully
1727	Up	Df	Yes	0.56	34.0	24.0	487.0	Int	Int	Mnd	Sha	
1728	Up	Df	No	0.00	0.0	0.0	0.0	Int	MRdg	MRdg	MRdg	
1729	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	OutofMU	
1730	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1731	Up	Df	Yes	0.78	52.0	36.0	1013.0	Sha	Int	Int	Mnd	
1732	Up	Df	No	0.00	0.0	0.0	0.0	Int	Mnd	Int	Int	
1733	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1734	Up	Df	No	0.00	0.0	0.0	0.0	Dist	Int	Int	Int	
1735	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1736	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1737	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1738	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1739	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Int	
1740	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1741	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1742	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1743	Up	Df	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1744	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1745	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1746	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1747	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	OutofMU	
1748	Up	Df	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1749	Up	Df	No	0.00	0.0	0.0	0.0	Int	OutofMU	Int	OutofMU	
1750	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1753	Up	Rd	Yes	0.80	48.0	54.0	1130.0	Mnd	Int	Sha	Sha	
1754	Up	Rd	Yes	0.52	32.0	26.0	430.0	OutofMU	OutofMU	Mnd	Sha	
1755	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1756	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope
1757	Up	Rd	Yes	0.56	32.0	28.0	359.0	Int	Int	Sha	Mnd	
1758	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1759	Up	Rd	Yes	0.72	50.0	33.0	692.0	Int	Int	Mnd	Sha	
1760	Up	Rd	No	0.00	0.0	0.0	0.0	MRdg	OutofMU	Oth	OutofMU	Gully
1761	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Oth	OutofMU	Steep slope
1762	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	OutofMU	
1763	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Sha	Sha	Steep slope
1764	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Sha	
1765	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope
1766	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Sha	Sha	Steep slope
1767	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Sha	Oth	Sha	Steep slope
1768	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Oth	Sha	
1769	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Oth	Oth	Steep slope
1770	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	Oth	Steep slope
1771	Up	Rd	No	0.00	0.0	0.0	0.0	Oth	Oth	Oth	OutofMU	Steep slope
1772	Up	Rd	No	0.00	0.0	0.0	0.0	Mnd	Int	Int	Int	
1773	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1774	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1775	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Sha	
1776	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1777	Up	Rd	No	0.00	0.0	0.0	0.0	MRdg	Int	Sha	Sha	
1778	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Sha	
1779	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1780	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1781	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

OBJECTID	T_level	MUSYM	Grid_comp	Mound_Zval	NS_diamete	EW_diamete	Mound_area	NWcorner	NEcorner	SWcorner	SEcorner	Notes
1782	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Sha	Int	Sha	
1783	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	Int	Int	Sha	
1784	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1785	Up	Rd	No	0.00	0.0	0.0	0.0	Int	OutofMU	Sha	Int	
1786	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Oth	Oth	Steep slope
1787	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	Int	
1788	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1789	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1790	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1791	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1792	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1793	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1794	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1795	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1796	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	OutofMU	OutofMU	
1797	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	OutofMU	OutofMU	
1798	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1799	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1800	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Sha	Sha	
1801	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1802	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Sha	Int	
1803	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1804	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1805	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1806	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Sha	Int	
1807	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Int	Int	Int	
1808	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
1809	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Oth	Drainage - gully
1810	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	OutofMU	Sha	Oth	Drainage - gully
1811	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Wat	Drainage - gully
1812	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Oth	Oth	Oth	Drainage - gully
1813	Up	Rd	No	0.00	0.0	0.0	0.0	Sha	Sha	Int	Int	
1814	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	
1815	Up	Rd	No	0.00	0.0	0.0	0.0	Int	Int	OutofMU	OutofMU	
1816	Up	Rd	No	0.00	0.0	0.0	0.0	OutofMU	OutofMU	Int	OutofMU	
1817	Up	Df	No	0.00	0.0	0.0	0.0	Int	Int	Int	Int	

APPENDIX E

ADDITIONAL SHADED RELIEF IMAGES

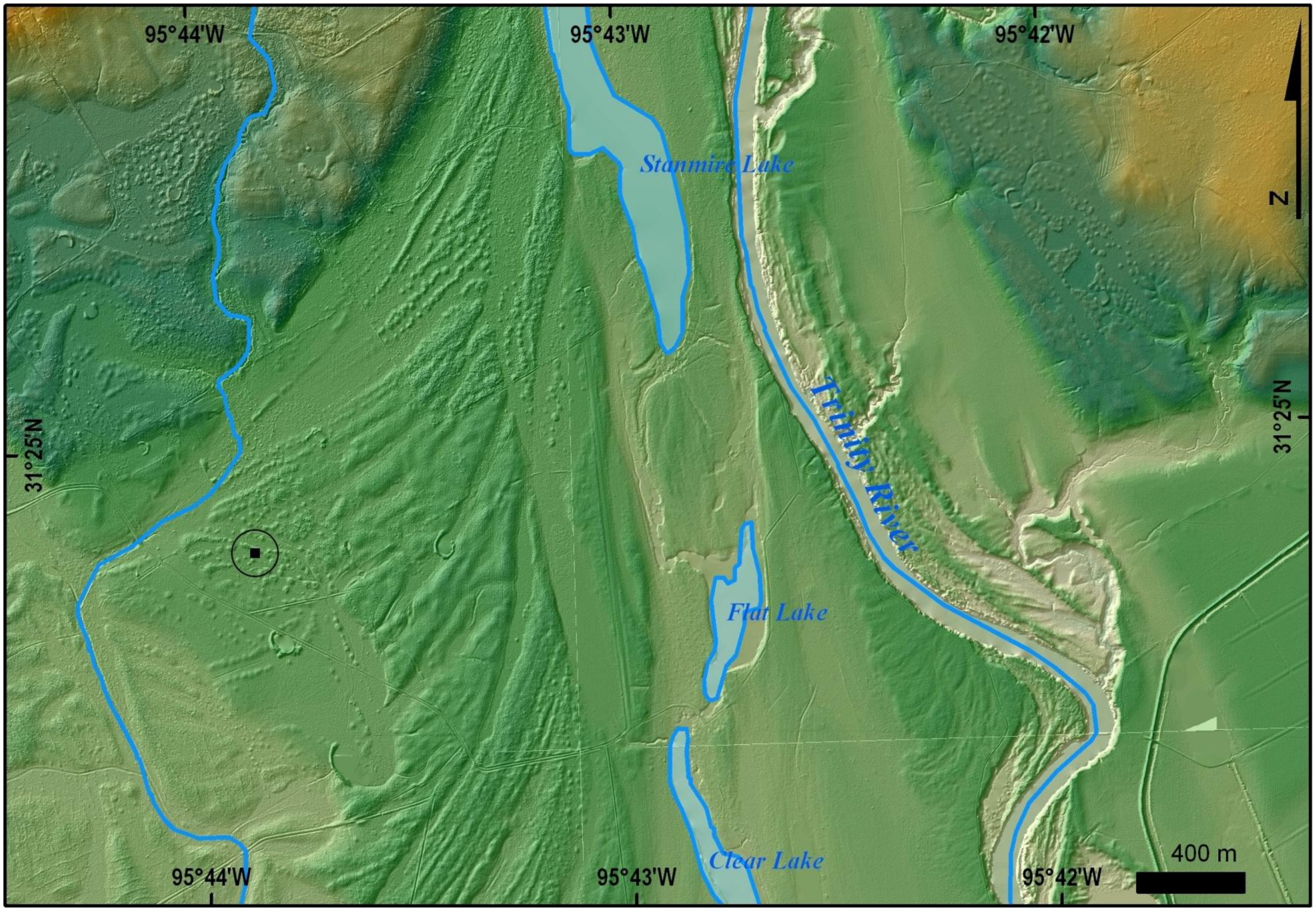

Fig. E-1. Shaded relief image of T-1 Site (Stanmire Lake Quad) at 1:24,000 scale. Trinity River, water bodies, and streams are delineated in blue. T-1 Stanmire Lake Site is represented by point within a circle.

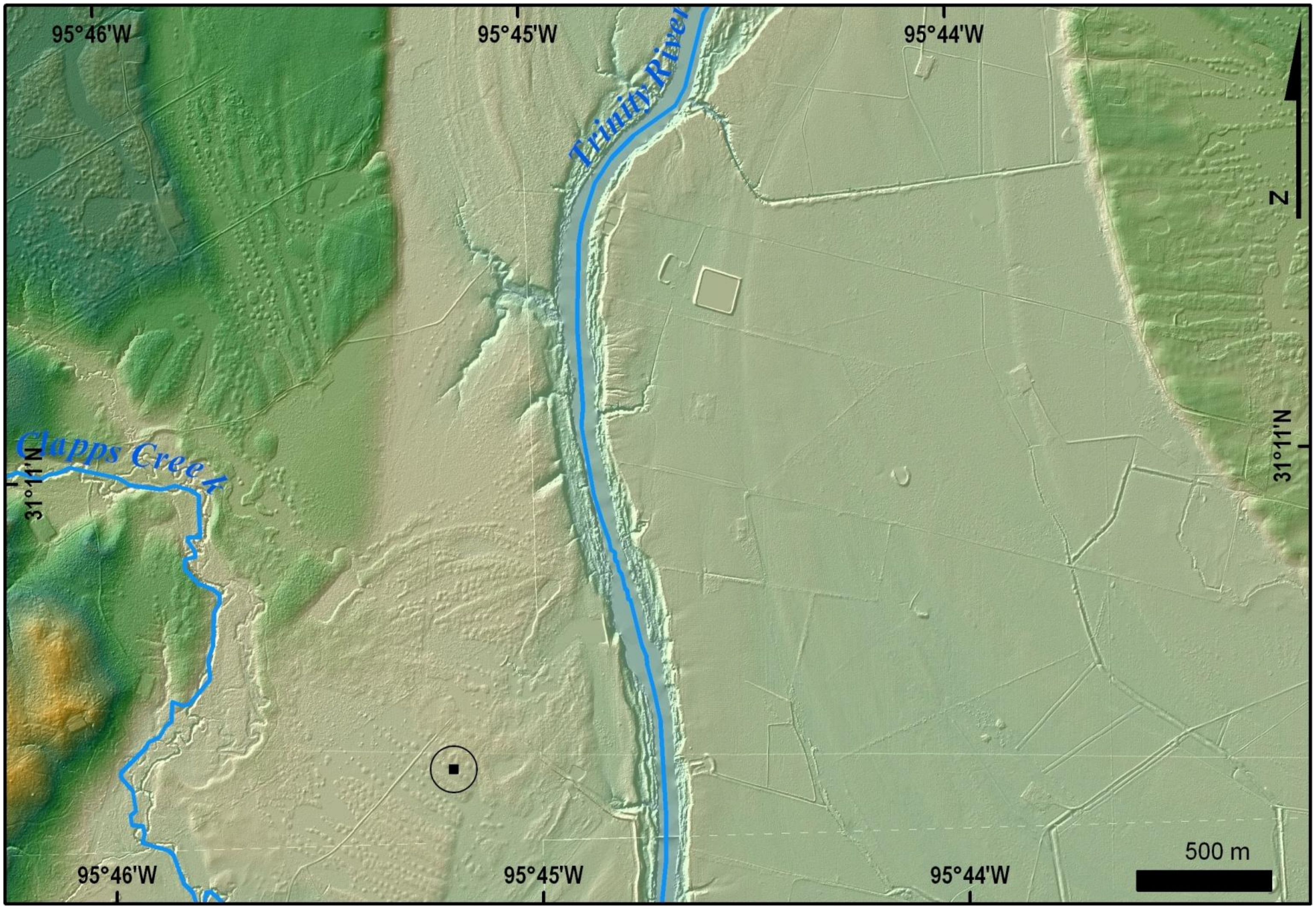

Fig. E-2. Shaded relief image of T-1 Site (Middleton Quad) at 1:24,000 scale. Trinity River and Clapps Creek are delineated in blue. T-1 Middleton Site is represented by point within a circle.

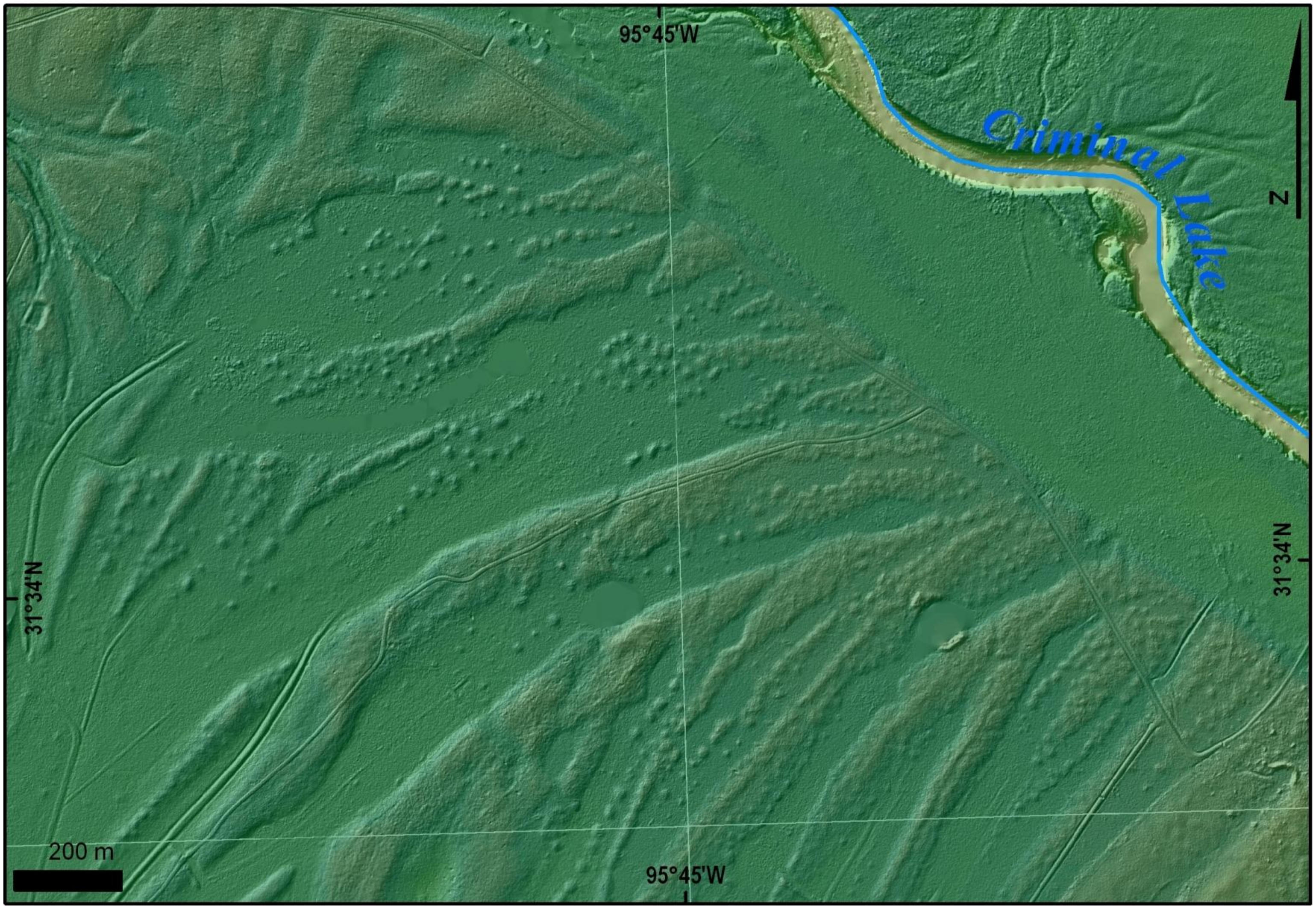

Fig. E-4. Shaded relief image of T-1 surface in northeastern Leon County at 1:12,000 scale. Water body delineated in blue.

VITA

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